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ABSTRACT

North Carolina and Dare County, with assistance from the federal government, are developing a seafood industrial park at Wanchese, a small residential community. The purposes of this park are to develop a major commercial seafood handling, processing, and distribution port in North Carolina; and to provide a home port with support facilities for a commercial fishing fleet. Whenever a large industry moves into a small community, a disruptive process occurs, with both adverse and beneficial tradeoffs. Issues and topics related to the development of the park form the focus of the nine interdisciplinary lessons in this unit. Each lesson includes key concepts, competency goals, objectives, materials needed, background information, teacher preparation, questions for students, and activities for use in language arts, social studies, art, and science classes. Topic areas explored in the lessons include: (1) location and general description of the park; (2) planning transportation; (3) environmental impacts; (4) air and water pollution; (5) retail and wholesale marketing; (6) seafood industry; (7) marine careers; (8) planning for recreational demands; and (9) community planning and the environment. Text for a filmstrip presentation and packet of materials to be duplicated for student use are included. (JN)

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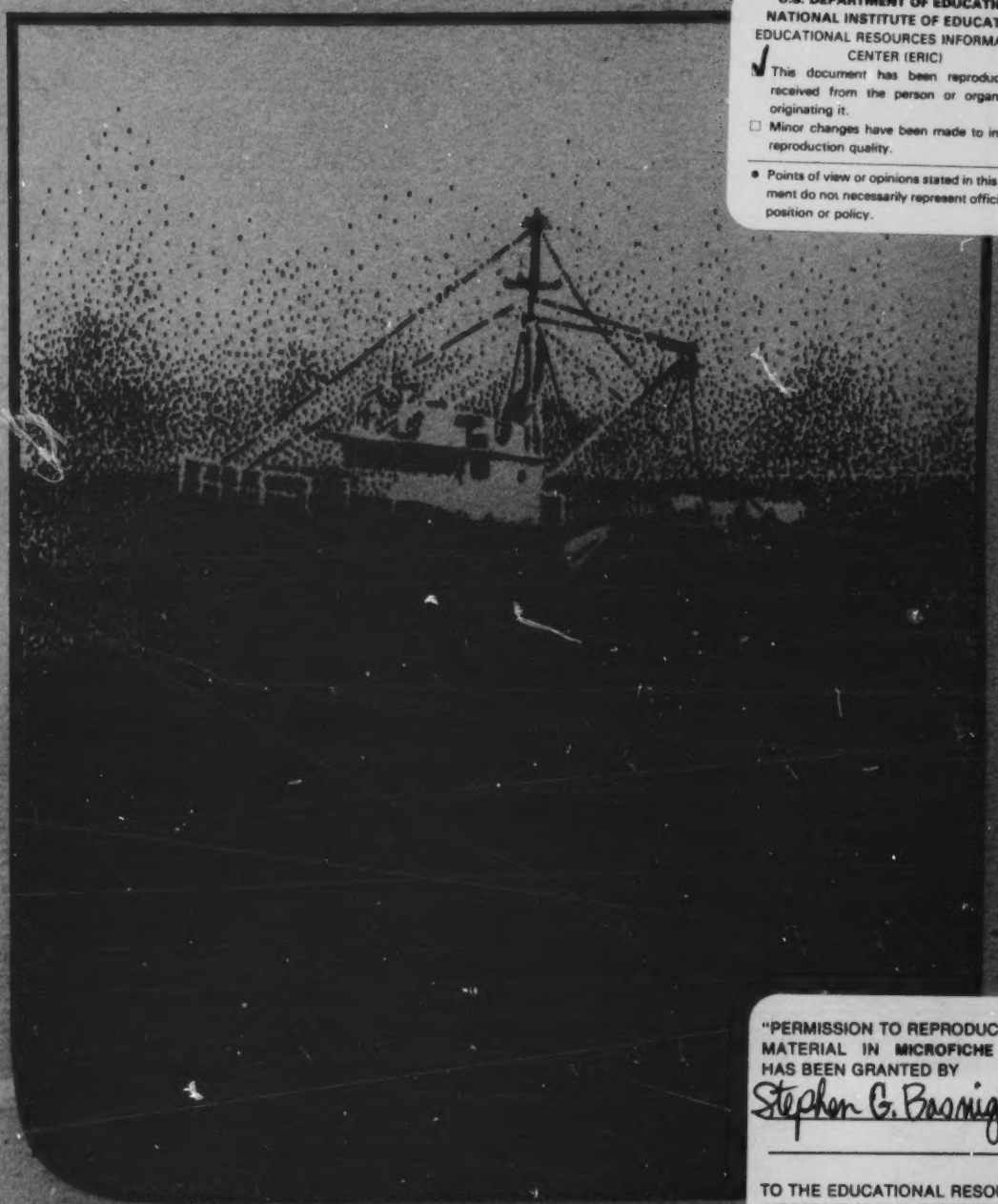
WANCHESE HARBOR-COMMUNITY DEVELOPMENT



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PROJECT CAPE TEACHING MODULE

Developed under an ESEA Title IV-C Grant

Dare County Board of Education
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TITLE: WANCHESE HARBOR-COMMUNITY DEVELOPMENT

GRADE LEVEL: 7

SUBJECTS: Language Arts, Social Studies, Art, Science

SKILLS: Inquiry, Manipulative, Creative, Organizational, Communicative

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Project CAPE Publication SOC

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UNIT CONCEPTS

WATER AND SOCIETY

Water influences history and human culture.

1. Water provides a source of food, raw material and energy for human consumption.

2. Water availability influences where people live.

3. Water is a medium of transportation, commerce and communication.

WATER AND HUMAN EXPRESSION

Water influences human aesthetic and spiritual value.

1. Water provides important forms of recreational activities during leisure time.

WATER AND HUMAN IMPACT

Human activity presents problems for aquatic ecosystems.

1. Water is a public resource.

2. Human activity may deplete aquatic organisms.

3. Human activity may deplete aquatic resources.

4. Human activity may degrade aquatic ecosystems by adding pollutants to the air and water.

Human activities present solutions to aquatic ecosystems management.

1. Humans are accountable for their effects on aquatic ecosystems.

2. Management of aquatic ecosystems depends upon the application of technological and scientific knowledge.

INTRODUCTION

Whenever a large industry moves into a small community, a disruptive process occurs, with both adverse and beneficial trade-offs. The Wanchese Seafood Industrial Park is expected to have just such an impact on the small community of Wanchese. Planning for the Seafood Industrial Park has been an important factor in determining the success of the project.

Wanchese is a small unincorporated community on the southern end of Roanoke Island in Dare County, North Carolina. Wanchese is primarily a residential community with an estimated population of 1,300. The primary occupations of Wanchese residents has been fishing, boat building and seafood processing.

The existing Wanchese Harbor basin covers approximately 2.5 acres with small seafood receiving facilities and refueling areas. The Wanchese Harbor serves as port for many fishing vessels that use the Atlantic Ocean from New England to Florida. The existing harbor becomes too crowded for safe navigation in severe weather, when boats seek harbors of refuge.

The State of North Carolina and Dare County with assistance from the federal government are developing a Seafood Industrial Park at Wanchese. The purposes of the Seafood Industrial Park are (1) to develop a major commercial seafood handling, processing and distribution port in North Carolina, and (2) to provide a home port with support facilities for a commercial fishing fleet.

The Wanchese Seafood Industrial Park will provide access, docking, water, waste treatment and electric facilities for the

harbor, seafood processing, and fishing industries. The State of North Carolina will lease space and provide basic services to firms for construction of seafood and marine related industries.

EXPLANATION OF CODING SYSTEM

FOR SUPPLEMENTARY MATERIALS

GRADE LEVELS AND SUBJECTS	CODE
K-2 Multidisciplinary	K-2a, K-2b, K-2c
3-4 Multidisciplinary	3-4a, 3-4b, 3-4c
5-6 Multidisciplinary	5-6a, 5-6b, 5-6c
SECONDARY SCHOOL	
English	ENG
Occupational Education	OE
Social Studies	SOC
Science	
Life	SC1
Earth	SC2
Biology	SC3

LESSON NUMBERS	
1	1.
2	2.
3	3.
etc.	etc.

SUPPLEMENTAL MATERIALS	
1	.1
2	.2
3	.3
etc.	etc.

EXAMPLES

K-2a
1.1 Translates: a supplemental sheet, booklet or game number 1 that accompanies the 1st lesson of Unit K-2a for grades K-2.

SC2
6.4 Translates: a supplemental sheet, booklet or game number 4 that accompanies the 6th lesson in Unit SC2 for earth science.

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TEXT	37	
FILMSTRIP		(Optional)
Test		(SOC)

LESSON NUMBER: 1

LOCATION AND GENERAL DESCRIPTION

KEY CONCEPTS

1. The Wanchese Harbor Project is located on the peninsula between Broad Creek and Mill Creek on the southeastern part of Roanoke Island in Dare County, North Carolina.

2. Community decision making is facilitated by involvement of all citizens.

COMPETENCY GOALS

1. The learner will use maps and globes.

2. The learner will know that local, state and national governments often assist one another in meeting the needs of the people.

OBJECTIVES

1. The student will locate the Wanchese Harbor Project on maps.

2. The learner will describe the purpose of the Wanchese Harbor Project.

3. The student will participate in community planning and decision making activities.

4. The student will explain the interdependence of government agencies for the Wanchese Harbor Project.

MATERIALS

Roanoke Island map
North Carolina map
Gull Haven map
ballot sheet
Eastern North Carolina map
overhead projector
council member roles on slips of paper
transparencies

BACKGROUND INFORMATION

The North Carolina Department of Natural and Economic Resources, Coastal Plains Regional Commission, U. S. Army Corps of Engineers and Economic Development Administration and Dare County, with federal assistance, are developing a Seafood Industrial Park at Wanchese

Harbor. The project area is located on the peninsula between Broad Creek and Mill Creek in the southeastern part of Roanoke Island. The entire project area covers approximately 49 acres. The town of Wanchese is adjacent to the project. The Wanchese Harbor is located 9 miles from the Oregon Inlet Bridge. The purposes of the Seafood Industrial Park are: (1) to develop a major commercial seafood handling, processing and distribution port in North Caroina and (2) to provide a home port with support facilities for a commercial fleet.

The existing harbor of Wanchese is approximately 2.5 acres and will be enlarged to 15 acres and will be deepened from 12 feet to 14 feet. Hydraulic pipeline dredging will be used to remove the material and will be placed in a 36 acre diked disposal area. The Seafood Industrial Park will be developed on the 36 acre disposal area.

Facilities at the Seafood Industrial Park to be designed and constructed by the State include an enlarged and deepened harbor basin, docking and mooring facilities, water supply system (including fire hydrants), electrical distribution system (including area lighting), waste water collection, treatment and disposal system, roads, (including access roads and parking), administrative building, refueling area, ice plant, building construction areas (these areas will be leased to commercial processors for constructing and operating seafood processing facilities).

The land necessary for the project has been acquired by the State in quitclaim titles. Quitclaim titles are used in land purchases when the seller transfers the title or deed to the purchaser and relinquishes all rights (inheritance) to the land.

The enlargement of the Wanchese Harbor and the development of the Seafood Industrial Park will occur in what is now an irregularly flooded marsh, consisting mostly of black needlerush marsh. Dredging will destroy 12.5 acres of marsh wetlands and tree-shrub community. There will be a decrease in the population of animals and plants as all habitats will be destroyed in the dredging process. It is stated in the Environmental Impact Statement that the long term economic benefit and general welfare of residents outweighs the loss of marshlands, plants and animals.

TEACHER PREPARATION

The teacher should duplicate copies of the Roanoke Island map, North Carolina map, eastern North Carolina map and Gull Haven Ballot Sheet for each student. The teacher should make a transparency of the Gull Haven map. In the Gull Haven simulation the teacher should explain that the students will vote as their council role models would. Council members may try to persuade the opinions of others.

ACTIVITIES

I. Map Activities

a. Give each student a map of North Carolina, eastern North Carolina and Roanoke Island.

b. Students will complete the fill in the blank and question sheet accompanying this lesson.

II. Land Use Simulation Game

a. Read the history of Gull Haven while displaying the Gull Haven map transparency on an overhead projector.

b. Select six students to role play town council members. Give the students their roles.

c. Council members will present their ideas for the development of the Edwards Property.

d. The class may discuss various plans.

e. The class will vote on one development plan.

QUESTIONS

1. What is the Wanchese Harbor Project? Which government agencies are sponsoring and financing the Wanchese Harbor Project?

2. Where will the Seafood Industrial Park be located?

3. What bodies of water can fishermen catch their fish before taking them to the Seafood Industrial Park?

4. Why is the Seafood Industrial Park to be located at Wanchese Harbor?

5. Who is going to finance the development of the Seafood Industrial Park?

6. On what type of land will the Seafood Industrial Park be built?

7. How can the Wanchese Harbor Project justify the use of marshlands for development of the project?

SOURCE

U. S. Army Corps of Engineers Final Environmental Impact Statement Wanchese Harbor Development Project. Wilmington, North Carolina. 1975.

ANSWERS

1. The Wanchese Harbor Project involves enlarging and deepening the existing harbor basin at Wanchese and constructing a Seafood Industrial Park to be handling, processing and distribution point for the North Carolina seafood industry.

2. On the southeastern part of Roanoke Island in Dare County. Adjacent to the community of Wanchese, on 49 acres of land on the peninsula between Mill Creek and Broad Creek.

3. Atlantic Ocean from New England to Florida, Croatan Sound, Pamlico Sound, Roanoke Sound. Albemarle Sound and Currituck Sound would not be probable sites. These sounds are almost entirely fresh water, shallow and much fish is caught by hook and line.

4. There is an existing harbor already at Wanchese with an existing seafood processing industry. Wanchese harbor is 16.7km (9 miles) from Oregon Inlet which allows passage to the Atlantic Ocean.

5. The State of North Carolina, grants from the Coastal Plains Regional Commission, and grants from the Economic Development Commission of the U. S. Department of Commerce.

6. Marsh wetland and some tree-shrub community.

7. The project will result in numerous economic benefits for the residents of Wanchese, Dare County and North Carolina and this probably outweighs the loss of marsh.

LESSON NUMBER: 2

PLANNING TRANSPORTATION

KEY CONCEPTS

1. Safe transportation is a major element in the development of the Seafood Industrial Park.

2. New transportation systems may need to be developed for implementation of the Wanchese Harbor Project.

COMPETENCY GOAL

The learner will understand the development of safe transportation systems.

OBJECTIVES

1. The student will be able to list various transportation vehicles used today and their functions.

2. The student will be able to plan a coordinated transportation system for the Wanchese Harbor Project.

MATERIALS (per team)

map of eastern North Carolina
map of Roanoke Island
magic markers
measuring cup
mixing bowl
tooth brush
2 cups all purpose flour
1/2 cup salt
3/4 cup warm water
food coloring (green)
tooth pick

BACKGROUND INFORMATION

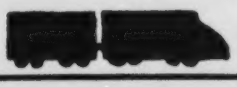
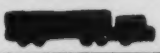
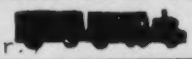
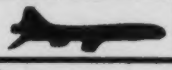
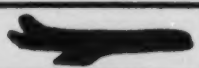
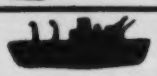
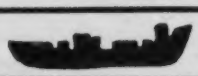
Transportation systems and networks move over land, water and air in automobiles, ships, railroads and airplanes. Modern transportation operates safely and quickly because of the many aids to transportations. Well paved roads, tunnels, and bridges help speed land transportation systems across rivers, mountains and other barriers. The shipping industry is dependent on safe harbors with well designed piers and wharves for loading and unloading cargo. Transportation systems are safer also because of technological devices. Boats and ships are able to operate in severe weather with radio, radar and gyrocompass. Radio, radar and computerized instrumentation has enabled airplane pilots to

fly in bad weather. Better designed major highways, computerized traffic systems, and safer cars and trucks have reduced automobile accidents. Railroads now have automatic signals in electric currents in the rails.

Transportation costs depend primarily on (1) the distance traveled, (2) amount of goods, (3) time required, and (4) convenience. Shipping is the least expensive type of transportation but is also the slowest method and is limited to certain ports. Trains are next in the cost scale, but railroads do not serve all communities. Trucks are able to carry smaller loads, faster and deliver anywhere. Air transportation is the fastest but also the most expensive.

Highways serving Roanoke Island are U.S. 264, that runs west and joins U.S. 17 at Washington, North Carolina; U.S. 64 running west and joining U.S. 17 at Williamston, North Carolina and U.S. 301/I95 at Rocky Mount, North Carolina; and U.S. 158 running north and joining U.S. 17 at Elizabeth City, North Carolina and U.S. 13 at Ahoskie, North Carolina. N.C. 345 connects Wanchese with U.S. 264, 64, and 158. The Seafood Industrial Park will be connected to State road 1140 in Wanchese by an access road (1500 feet long and 22 feet wide).

There is a small airport at Manteo, accessible by N.C. 345 and U.S. 64/264. Norfolk International Airport is 110 miles north of Wanchese. Roanoke Island is not served by railroad, but Elizabeth City is served by Norfolk and Southern Railroad, which is 67 miles away, accessible by U.S. 64 and U.S. 158. Deep water ports for shipping processed seafood are 160 miles south in Morehead City or 110 miles north in Norfolk.

TYPE OF CARRIER	SPEED (miles/day)	VOLUME CARRIED (ton-miles/day)	COST (per ton-mile)
RAILROAD TRAIN (US Main Line) 	460	3,450,000 (150 cars at 50 tons/car)	$0.014
MOTOR TRUCK (US Common Carrier) 	700	14,000	$0.05
EXPRESSWAY MOTOR TRUCK (US Common Carr 	1,000	40,000	$0.05
AIRPLANE (DC-3)	3,600	10,800	$0.22
JET PLANE (707 & DC-8) 	11,500	245,000	$0.10 max.
JUMBO JET AIRPLANE (747) 	12,000	1,200,000	$0.10 max.
CARGO SHIP (break-of-bulk) 	550	6,820,000	$0.01 - $0.05
CONTAINER SHIP 	660	17,400,000	$0.01 - $0.05

Development of the Seafood Industrial Park will increase the number of fishing vessels operating out of Wanchese Harbor. There will be no cargo vessels (freighters). The processed seafood will be taken to distribution centers and to ports for shipment for overseas by trucks on highways. It is expected the existing highway network will support the movement of goods.

Land use patterns determine the requirements for types of transportation systems. Residential areas and places of employment create the work-trip pattern. Freight transportation and recreational travel also help determine transportation systems.

A problem in some transportation systems is the movement of workers during the morning and afternoon rush hours. Since most people use their automobiles, a public transit system could help reduce the rush hour problem.

There are three types of freight movement in any region's transportation system: freight movement into, out of and within the region. All commodities originating from outside the area and brought into this area are primarily by trucks, while the fish are brought in by boat. All commodities leaving this area are carried by trucks. Prior to the building of modern bridges all commodities entering and leaving this area was by boat.

Areas of consideration for this transportation are: the conflict between freight trucks and tourist traffic in the summer, the sole dependence on trucks for freight movement and only 2 two-lane bridges for evacuation in case of hurricanes.

TEACHER PREPARATION

The teacher should have salt dough materials ready (measured) for each group to prepare the map.

STUDENT PREPARATION

Combine flour and salt; mix well. Add water and green food coloring; knead until dough is smooth and without cracks. Shape into the form of your county.

ACTIVITIES

I. Making Roanoke Island Map or Your County Map

   a. Divide the class into groups of four.

   b. Two students mix materials and two other students mold salt dough into the shape of Roanoke Island or your county.

c. Let model dry overnight.

d. Students will locate Manteo and Wanchese or town in your county and place paper tags on model.

II. Developing a Transportation System

a. Each group will develop a new transportation system for Roanoke Island or your county including land, air and sea (new highways, airports, etc.).

b. Students will mark the new transportation with magic markers.

c. Each group will present and explain their transportation system.

III. Routing the Seafood to Market

a. Give each student a map of eastern North Carolina and a copy of the worksheet.

b. Students will answer questions on the worksheet.

c. Discuss the answers to the questions.

d. Let students grade their peer's worksheets.

SOURCES

Mayer, Harold M., "Transportation," Compton's Encyclopedia, 1974.

Nelson, Doreen G., Manual for the City Building Education Program, U.S.A.: 1975.

LESSON NUMBER: 3

ENVIRONMENTAL IMPACTS

KEY CONCEPTS

1. Management of aquatic ecosystems depends upon the application of technological and scientific knowledge.

2. The maintenance of aquatic environments depends upon value judgements and ethical considerations.

COMPETENCY GOALS

1. The learner will develop a positive attitude toward the need for conservation, preservation and wise use of natural resources.

2. The learner will know that natural resources may be consumed, conserved, polluted, destroyed and renewed.

OBJECTIVES

1. The student will be able to describe the purpose of Environmental Impact Statements.

2. The student will be able to list the environmental impacts of the Wanchese Harbor Project.

MATERIALS

wooded lot or field near school
Organisms/Habitat Study Cards
List of endangered species in project area
Endangered and Threatened Wildlife of
Kentucky, North Carolina, South Carolina and Tennessee
available from the North Carolina Agricultural Extension Service

BACKGROUND INFORMATION

An Environmental Impact Statement must be prepared and submitted by each Federal agency in advance of each major action under their jurisdiction that may significantly affect the quality of the human environment. Such actions may include new highway construction, harbor dredging or filling, nuclear power plant construction, river channeling, bridge construction, a Federal agency's proposal for legislation. Each statement must disclose the environmental consequences of a proposed action. Environmental Impact Statements

must be prepared for projects which are undertaken directly by an agency, supported in part by Federal contracts or loans, or part of a Federal permit and license agency.

Each Environmental Impact Statement must include a detailed description of the proposed action, discussion of probable impact on the environment, adverse environmental effects that can be avoided, alternative actions that might alleviate some of the adverse environmental effects. A draft statement is prepared at least 90 days before proposed action and circulated to other Federal agencies for comments and made public so individual citizens can make comments or raise objections. A final statement must be made public at least 30 days before proposed action. The final statement must include a discussion of the objections and problems raised in comments on the draft.

The Environmental Protection Agency is the principal Federal regulator of pollution control matters. Under Section 309 of the Clean Air Act, EPA must "review and comment in writing on the environmental impact" of any action proposed by any Federal agency. EPA may code the nature of its comments indicating endorsement of the proposed action, request for more information to determine environmental damage or objection to the action on environmental grounds. Generally, EPA has no authority to stop a project sponsored by another Federal agency; it acts only in an advisory capacity to other agencies; Congress, Council on Environmental Quality and the President.

The Environmental Impact Statement on the Wanchese Harbor Development Project was prepared by the U. S. Army Corps of Engineers. Since the proposed plan of development required two Federal actions, (1) a Department of the Army, U. S. Army Corps of Engineers, permit for construction of the harbor and (2) monetary grant from the Economic Development Administration, Department of Commerce, for construction of the physical facilities for the Seafood Industrial Park, an environmental statement was required.

The draft Environmental Impact Statement was circulated to other federal agencies and made public for comment in the latter part of 1976. The comments and objections from citizens and federal agencies were printed in the final Environmental Impact Statement.

The harbor will be enlarged by dredging and the spoil will be placed in a disposal site. About 42 acres of freshwater marsh grass, shrubs and trees will be destroyed by the dredging. All slow moving organisms on the bottom will be destroyed. It will take about two years for the bottom to recolonize. The animals that live on land (reptiles, birds, amphibians, mammals) will try moving into neighboring areas, but since the habitats are likely to be at carrying capacity, the displaced animals will not be able to survive. Therefore there will be net decrease in the animal population. The loss of freshwater marsh by dredging will mean a loss of food productivity from the base of the food chain. The marsh grasses capture the sun's energy and this food is the basis of the food chain. The loss of marsh will mean less food moving into the estuaries, possibly reducing fish population.

It is stated in the Environmental Impact Statement that the long term economic benefit and general welfare of residents outweighs the loss of marsh lands, plants and animals.

TEACHER PREPARATION

The teacher may need to read the Final Environmental Statement Wanchese Harbor Development Project and be familiar with its contents.

ACTIVITIES

I. Endangered Species

a. Show a film on endangered species.

b. Give each student a list of the endangered species found in the project area. Allow the students to make a report, picture or drawing of the endangered species.

c. Have someone from a State Park or National Park talk to your class about endangered species in your area.

d. Let students make organism/habitat cards for each endangered species. (See sample cards.)

II. Student Environmental Impact Statements

a. Tell the students that they are going to prepare an Environmental Impact Statement for a wooded lot or field near the school. Pretend that the school plans to build a playground or activity field on the site.

b. Assign the following responsibilities to groups of students:

1. Identify the plants growing there.
2. Identify the animals living there.
3. What is the present use of the lot?
4. What plans do the school have for the lot?
5. What will happen to the plants and animals?
6. Develop an alternative plan for the school.

III. Film

a. Show any film pertaining to environmental concerns or endangered species.

Problems of Conservation: Wildlife / may be ordered through
1970 13 minutes Color / your public library

Marshland Is Not Waste Land / may be ordered through
1962 14 minutes color / your public library

QUESTIONS

1. What is an Environmental Impact Statement?

2. Who writes Environmental Impact Statements?

3. What is the Environmental Protection Agency and what is their role in Environmental Impact Statements?

4. What impact will the Wanchese Harbor Project have on the environment?

5. Describe a food chain in the marsh.

6. What economic advantages will the Wanchese Harbor Project bring to the area?

REFERENCES

U.S. Army Corps of Engineers, Final Environmental Statement Wanchese Harbor Development Project, Wilmington, North Carolina: 1975.

U.S. Environmental Protection Agency, Office of Public Affairs, In Productive Harmony, Washington, D.C.: GPO, 1975.

LESSON NUMBER: 4

AIR AND WATER POLLUTION

KEY CONCEPTS

1. The construction of the Seafood Industrial Park may change the level of water and air pollution.

2. Potential pollution problems of Wanchese Harbor are fish waste products from seafood processors and oil and gasoline spillage from boats.

COMPETENCY GOALS

1. The learner will identify and define problems and suggest ways of solving them.

2. The learner will know that natural resources may be consumed, conserved, polluted, destroyed and renewed.

OBJECTIVES

1. The student will be able to describe the changes in level of water and air pollution.

2. The student will be able to identify sources of pollution.

3. The student will be able to describe solutions to pollution problems.

MATERIALS

1 pint of fresh whole milk
1 cup of potting soil
1 box table salt
microscope and glass slides
alcohol burner
small pan for boiling water
fresh water samples from ponds, creeks or sounds
1 bottle imitation vanilla extract
100 small paper cups
5 4-liter (one gallon) plastic milk cartons
1 cup of chlorine bleach
sink or plastic bucket for disposal of water

VOCABULARY

coliform	turbidity	bacteria	cholera
chlorination	siltation	hepatitis	typhoid fever

BACKGROUND INFORMATION

Presently, Wanchese does not have a municipal water supply and the residents depend on domestic wells. Dare County has built a water storage tank and will provide municipal water to Wanchese. Wanchese does not have a municipal wastewater treatment system. Wastewater treatment is limited to septic tanks, drain fields and direct discharge into the estuary. After heavy rains, septic tank systems overflow and sewage is carried into streams and estuaries.

Coliform bacteria are used as indicators of sewage pollution. Coliform bacteria are found in the intestines of humans. Shellfish that are grown in waters contaminated by sewage can lead to such diseases as typhoid fever, cholera, gastroenteritis, and infectious hepatitis if eaten. It is from the analysis of bacterial coliform counts that the Shellfish Sanitation Program advise for certain shellfish grounds be closed to harvesting.

A water supply system will be constructed to meet the demand of the Seafood Industrial Park. The water supply system will include two deep wells, a 250,000 gallon elevated storage tank, chlorination system, well house, pumps and distribution lines. Investigations indicate there is an adequate supply of good quality groundwater and will not endanger groundwater resources of others in the area.

A wastewater collection, treatment and disposal system will be built at the Seafood Industrial Park to handle all wastewaters from the seafood processing operations and domestic sewage discharges. The treated wastewater will be discharged into Mill Creek. It is expected that this will result in improved water quality of Mill Creek and the harbor because presently there is no treatment and untreated seafood and human waste is being discharged from the existing facilities into the harbor.

The dredging will cause temporary adverse effects to fish, oysters and other shellfish from increased turbidity levels and from silting. But within a few years, bottom dwelling organisms will return.

The Wanchese Harbor Project is not expected to have significant impact on noise or odor.

TEACHER PREPARATION

1. Fill the clean milk containers with water and add the indicated materials to each. Do NOT let the students see you make the solutions.
2. Screw the lids on tightly and shake to mix the contents. Keep containers capped until you are ready to use the solutions.

BOTTLE	ADD	AMOUNT
1	soil	1 tablespoon
2	milk	3 teaspoons
3	salt	6 tablespoons
4	nothing	
5	vanilla extract	2 teaspoons

ACTIVITIES

I. Clean Water for Drinking

a. Each student will have a chance to look at the water samples by pouring a small amount into a paper cup.

b. Tell the students the samples do not contain anything dangerous to smell.

c. Each student will decide if they would drink it or use the water for some other purpose.

d. Students will record their results on the data sheet.

II. Water Pollution - Audiovisuals

a. Show a film about water pollution, ordered through your regular school sources or from these listed below:

FS Series Two: The Life of Fishes, No. 6 The Fragile Balance. The Cousteau Group Inc. Sound. Color. (Available from North Carolina Marine Resources Center/Roanoke Island)

M The Poisoned Sea (Moonlight Productions) 1973. Available from Moonlight Productions, 2650 California Street, Mountain View, CA 94040.

M Santa Barbara - Everybody's Mistake (Indiana University) 1970. Available from Indiana University, Audio-Visual Center, Bloomington, IN, 41401.

III. Purifying Water Contaminated by Aquatic Life.

a. Observe water from a stream or pond under a microscope. How many kinds of aquatic life do you observe?

b. Boil a small amount of pond water. Observe under a microscope. Does any aquatic life remain?

c. Add 2-3 drops of chlorine bleach to another sample of pond water. What effect has the chlorine had on aquatic life?

d. Of the two methods used for purifying water, which is most practical for treatment plants to use?

IV. Visitor to Classroom

a. Ask someone from your Health Department or Shellfish Sanitation to visit your classroom and discuss water quality in your community.

V. Student Designed Equipment to Purify Water

a. Allow students to design and build a water purifying system.

QUESTIONS

1. How is water pollution a health problem?
2. How will the Wanchese Harbor Project change the quality of water in Mill Creek?
3. What water supply systems will be built at the Seafood Industrial Park?
4. What effect will chlorination have upon the treatment of waste water?
5. What are the effects of dredging to bottom dwelling animals?
6. What are coliform bacteria?
7. Who checks the water quality for health reasons?

REFERENCES

Brenchley, David L. and John O. Towler, The Environment: Activities and Explorations, New York: Houghton Mifflin Company, 1975.

LESSON NUMBER: 5

MARKETING: RETAIL AND WHOLESALE

KEY CONCEPT

The Wanchese Seafood Industrial Park is going to market processed seafood through wholesale and retail channels.

COMPETENCY GOALS

1. The learner will know that different communities may use their economic resources in different ways.
2. The learner will be able to develop and use graphs.

OBJECTIVES

1. The student will identify the different marketing opportunities available for the Wanchese Seafood Industrial Park.
2. The student will be able to develop graphs from data about the seafood industry.

MATERIALS

graph paper	small boxes	tin cans	glue
pencils	crayons	paint	newsprint paper

VOCABULARY

histogram	retailer	wholesaler	drawn
advertisement	producer	consumer	processor

BACKGROUND INFORMATION

The purpose of the Seafood Industrial Park is to encourage more fishing vessels to operate out of Wanchese Harbor and to increase the wholesale market by providing receiving, processing, distribution and marine services for seafood firms. Industrial Parks of all types concentrate similar industries in one area for better transportation networks, concentrated industrial areas and easier accessibility to buyers.

Before seafood is served to you at home or in a restaurant, it has passed through several processes and stages. The first link in the chain of events is the fishermen who caught the food from the sea. The fishermen bring the catch to the dock and sell it to a

seafood dealer. The dealers sort the fish by size and quality and sell the fish to the wholesalers.

The price paid to fishermen is determined by the market prices around the country. The National Marine Fisheries Services of NOAA publishes weekly market reports that contain information on prices, market conditions, landings, imports, exports and market receipts of fishery products in major fish trading centers. The report published in New York includes market values for North Carolina. It is printed on green paper and commonly called "green sheets." The prices quoted in the "green sheets" are the prices that wholesalers quote to retailers.

The seafood processor is known as a wholesaler because they buy goods (fish) in large quantities for resale to retailers or other middlemen. The processors clean, can, pack and freeze the seafood for resale to fish markets, restaurants and other wholesalers. The retailers are the fish markets and restaurants who sell in small quantities direct to the consumer.

In order to make a profit in the seafood industry all parties must sell at prices higher than their operating expenses. The fishermen's expenses are fuel for the boat, boat maintenance, boat insurance, equipment and net repair. The processor's expenses are prices for seafood, labor costs and factory overhead. The retailer's expenses are wholesale prices, freight delivery and building costs.

Advertising plays an important role in selling any product. Advertising increases the awareness of a product and is directed to make the consumer to want the product. Seafood has many good points that could be used in an advertising strategy. Seafood is high in protein, has low natural fat content, has vitamins A and D, iodine, low cholesterol, wide variety and short cooking time.

TEACHER PREPARATION

The teacher should duplicate copies of the North Carolina Landings for 1979 for distribution to students. Call your local seafood market and get the prices for five seafoods for students to graph. The teacher should duplicate the Fishery Market News Reports on green paper to simulate the practice of the National Marine Fisheries Service.

STUDENT PREPARATION

Students should look through magazines and newspapers for advertisements about seafood products and bring them to school.

ACTIVITIES

I. Graphing

a. Give each student the figures for the fishing industry and graph paper from SOC 5.1.

b. Have the students draw a bar graph of the seven most economically important fish (in dollars) for 1979.

c. Have the students draw a bar graph of the five fish species with the highest poundage (lbs.) for 1979.

d. See sample graph, SOC 5.2.

II. Marketing and Advertising

a. Divide the class into two sections. One group will be responsible for advertising for a seafood wholesaler and one group will be responsible for advertising for a retail seafood company.

b. The groups should decide and list who their market audience will be.

c. The group will develop a marketing strategy which includes transportation system, product packaging, advertisements, pricing and consumer education.

d. The students should bring in seafood product advertisements from magazines, newspapers, ideas from television, and radio commercials.

e. Have the students design and draw seafood advertising posters and seafood product packages for boxes and cans.

III. Reading "Green Sheets"

a. Give each two students a copy of the green sheets and information leaflet explaining the green sheets and the student worksheet, SOC 5.3 - 5.7.

b. Explain that the abbreviations used in "green sheets" are found in the information leaflet.

c. Explain to students that all quantities are in THOUSANDS OF POUNDS and prices are in cents per pound.

d. Start with the bluefish values and information. Have students look up each abbreviation and write the information down for bluefish. Bluefish information: supply moderate, market about steady, not sold out, North Carolina round medium .45 - .50 a pound according to quality, drawn (intestines removed) large asking .40 a pound.

e. Have paired students work together to write the information about eels.

f. Have students complete the worksheet.

QUESTIONS

1. How are prices that are paid to fishermen for their seafood determined?

2. Who are the seafood wholesalers and who is their market?

3. Who are the seafood retailers and who is their market?

4. Why is advertising important in marketing? List different methods of advertising.

5. How are new products introduced to the consumer? How could new seafood products be introduced?

6. What are the most economically important (in dollars) fish species in North Carolina?

7. What are "green sheets?"

REFERENCES

Batis, Harry P. Wholesaling in Distribution, Austin: The University of Texas at Austin, 1971.

U. S. Department of Commerce, New York Fishery Market News Reports N-57, New York: May 1979.

LESSON NUMBER: 6

THE SEAFOOD INDUSTRY

KEY CONCEPT

Water provides a source of food, raw materials and energy for human consumption.

COMPETENCY GOAL

The learner will know that economic resources exist in every community.

OBJECTIVES

1. The student will be able to list commercially important economic fish and shellfish species in North Carolina.
2. The student will describe the commerical fishing and seafood processing in North Carolina.
3. The student will be able to describe different ways to process seafood.

MATERIALS

oyster knife
filleting knife
hot plate
garbage bags
cooking utensils
food materials are listed with recipes

BACKGROUND INFORMATION

The Seafood Industry in North Carolina is basically comprised of two parts: (1) the commercial fisheries and (2) the seafood processors. The total value of North Carolina's commercial fish landings for 1979 was $58.5 million with total poundage at 390.5 million pounds. North Carolina's seafood processors were paid $45.5 million for their products. It is estimated the seafood industry in North Carolina generates between $175 million and $200 million for the state's economy. Dare County is second in the state for commercial landings, with total value at $12 million. The value of commercial landings is the price fishermen are paid when they sell their catch at the dock.

The most economically important finfish in North Carolina are menhaden, flounder, croaker, gray seatrout, spot, eels, bluefish and mullet. Menhaden are not used for food fish, they are for industrial use as fish oil and fertilizer. The most economically important shellfish are shrimp, blue crabs, clams, oysters and scallops.

NORTH CAROLINA LANDINGS FOR 1979

SPECIES	POUNDS	DOLLARS
Alewives	5,119,150	313,779
Bluefish	3,405,674	654,727
Croaker	20,558,193	4,345,433
Eels	954,534	800,529
Flounder	18,452,179	8,847,332
Grouper	675,840	456,953
Menhaden (Industrial)	254,329,990	9,918,870
Gray seatrout	14,759,197	2,940,319
Spot	7,303,405	1,430,017
Blue Crabs, Hard	26,618,423	4,620,949
Blue Crabs, Soft	80,367	129,908
Shrimp (Heads on)	4,941,240	9,728,917
Clams, Hard (meats)	1,454,870	4,475,327
Oysters (meats)	665,439	925,964
Scallops, Sea (1978)	983,875	1,828,129
Squid	563,929	190,107

Fishermen are both men and women who harvest the living creatures of the sea. Most fishermen come from fishing families or fishing communities. Young people learn how to fish by watching their relatives and working on boats. A number of fishermen are independent business operators who own their own boats or lease them. Some are one-person or family operations; many have hired employees. Fishing is a gamble and today's fisherman must be flexible to go after whatever there is to be caught.

The seafood processing industry consists of the processing, packing, canning and freezing activities used to prepare fish and shellfish for markets and restaurants. Some fish are packed whole in ice, others are filleted, smoked, canned and minced. Crabs are steamed and then the meat is picked from the shell and packed and canned. Oysters, clams and scallops are removed from the shells and processed for canning and freezing.

TEACHER PREPARATION

The teacher will need to know how to scale and clean fish and clean and pick crabs. The teacher needs to have enough fish and crabs for students to work in groups after a demonstration. Materials for preparing recipes should be donated from students' parents. The recipes are for 6 servings, so multiply ingredients in the recipes by 4 to serve approximately 25 people. Give students the recipes for fish and crabs. If crabs are too expensive or cannot be found, substitute shrimp in salad recipe. Oysters could be used if available.

STUDENT PREPARATION

Students can bring fish and crabs that they have caught on weekends. The fish should be refrigerated or kept on ice. Crabs must be alive when they are cooked.

ACTIVITIES

I. Processing Fish

   a. The teacher will demonstrate how to scale and clean fish.

   b. Students will be allowed to scale and clean fish.

   c. Students will prepare fish for cooking.

   d. Students will cook fish according to the recipe.

II. Processing Shellfish

   a. Students will steam crabs.

   b. The teacher will demonstrate how to pick out crab meat.

   c. Students will be allowed to pick out crab meat.

   d. Students will prepare crab recipe.

III. Film on Seafood Industry

   a. Big Fish, Little Fish
   28 minutes B/W

   May be ordered through your public library from the N.C. State Library.

IV. Field Trip

a. Visit any seafood processing company.

b. Visit any food processing company in your area.

QUESTIONS

1. What comprises the seafood industry in North Carolina?
2. What is the value for North Carolina's seafood industry?
3. Which are the economically important fish species in North Carolina?
4. Which are the important shellfish?
5. Which fish and shellfish are the highest price?
6. How are fish and shellfish processed?

REFERENCES

National Marine Fisheries Service, North Carolina Landings, 1979, Washington, D.C., 1980.

Interview with Katy West, Director of Statistics, North Carolina Division of Marine Fisheries, October 6, 1980.

LESSON NUMBER: 7

MARINE CAREERS

KEY CONCEPT

The Wanchese Harbor Project will require a number of skilled employees trained in different areas of marine technology.

COMPETENCY GOALS

The learner will know that there is a division of labor (specialization) in neighborhoods and communities (economics).

OBJECTIVES

1. The student will be able to list and describe different marine related occupations.
2. The student will observe men/women working on the job at actual sites.
3. The student will gain an understanding of the marine career field in general.

MATERIALS

marine career brochures
photographs/slides of established marine businesses
tape recorder
camera

VOCABULARY

skilled	tradesmen	shipwright
semi-skilled	laborer	pile bucks

BACKGROUND INFORMATION

The Wanchese Harbor Project will need skilled manpower and trained personnel in the areas of marine electrical repair, marine railway and vessel repairs, shipbuilding, complete fish processing, electronic equipment sales and service, air conditioning and refrigeration, engine sales and service, fuel sales, ice manufacturing and storage, and frozen food processing. Without trained and qualified personnel, the project would not succeed.

Boat building and repair employment is found in areas of construction and maintenance of sport, recreational and commercial fishing boats. People who wish to enter this field have to serve an apprenticeship from 3 to 5 years. This formal training program is on-the-job training with some trade instruction. Common trades of ship building and repair are electricians, sheet metal workers, carpenters, painters, shipwrights, pipe fitters and boilermakers.

The marine construction industry involves building of port and harbor facilities such as piers, bulkheads, bridges, warehouses and jetties. This industry employs skilled tradesmen such as carpenters and pile bucks (workers who drive pilings). Machine operators and welders are semiskilled workers that work with their hands. A common laborer is an unskilled worker who does the handling and moving of materials.

The workers who load and unload the ship's cargo are called longshoremen, either unskilled or semiskilled. The longshoreman is hired from a union hall and works for different companies aboard different ships. Mechanization has reduced the amount of physical labor.

Shipping clerks or stock clerks work for shipping and marine equipment companies. These people must read and count accurately, they record the amount of goods loaded and unloaded from ships and warehouse inventories.

The handling of seafood at the Wanchese Seafood Industrial Park will require laborers to move the fish from the hull of the boats to the dock and into the processing and packing houses. The processors will require unskilled and semiskilled employees to process, pack, can and freeze the seafood.

TEACHER PREPARATION

The teacher should be familiar with the different types of marine related occupations at the Wanchese Seafood Industrial Park. The teacher should have access to Occupational Outlook Handbook, Bureau of Labor Statistics, U.S. Department of Commerce. This book will be found in most school's guidance counselor office or vocational education classroom.

ACTIVITIES

I. Interviews with Employers and Employees

   a. Have students develop questions for the interviews, one set for employers and one set for employees.

   b. Select the 10 best questions for the interviews.

   c. Have students form working pairs and call the employer for permission to conduct the interviews.

d. The students will make appointments and visit the work site to interview the employer and employee separately.

e. The students can use tape recorders for the interview.

f. The pair of students will prepare a report for the class about the occupation they have researched.

g. If students have cameras, photograph the work site and employees.

II. Researching Marine Careers

a. Invite either the high school guidance counselor, vocational education teacher or someone from the Wanchese Seafood Industrial Park Authority to discuss career opportunities in marine related occupations.

III. Marine Careers Display Board

a. Let students design bulletin boards with photographs or artwork of marine careers.

QUESTIONS

1. List and describe different jobs at the Wanchese Seafood Industrial Park.

2. Distinguish between unskilled, semiskilled and skilled workers.

3. How can one obtain training for marine related jobs?

4. Which occupation is most interesting to you?

REFERENCES

Rice, Lauren, "Opportunities For Marine Related Industry," Occupational Skills Center, Seattle, WA.

LESSON NUMBER: 8

PLANNING FOR RECREATIONAL DEMANDS

KEY CONCEPT

With the development of the Seafood Industrial Park recreation will need to be provided for youngsters and adults.

COMPETENCY GOALS

1. The learner will perform safely in recreational pursuits.
2. The learner will understand the necessity of rules and regulations in all community recreational activities.

OBJECTIVES

1. The student will be able to list different types of recreational facilities in the community.
2. The student will make decisions on the impact of new recreational facilities in the community.
3. The student will be able to plan a recreational program for a community.

MATERIALS

map of community blue and red pens rulers podium camera
newsprint paper

BACKGROUND INFORMATION

The Seafood Industrial Park is being developed in a small community. It is important that careful planning of recreational needs be applied to insure that developments in this area are assets rather than problems.

Unspoiled natural environments such as beaches, mountains, forests, dunes, marshes, streams and rivers are natural resources for recreation. All types of water recreational activities are available such as sailing, boating, fishing, water skiing, swimming, snorkeling and diving and canoeing. Hiking, camping, hunting, hang gliding, snow skiing and white-water rafting are available in forests and mountains.

There are certain types of recreation that some people find objectionable. They feel these activities disrupt the aesthetics

of the coastal environment. Some of these recreation types are go-cart tracks, animal mini-golf courts, arcades and electronic games, water slides, roller coasters, ferris wheels and jet skis. Many people think these activities are necessary at resort areas.

When planning for recreational needs of a community, it is necessary to have information on population size, age distribution, income level, occupations, leisure time and existing recreational facilities. The planner needs to know the amount of leisure time and current recreational pursuits. Does the community want new types of recreation or merely expand the present system? Will the community sponsor recreational events or will it be left to private businesses?

Students must be aware of safety precautions and hazards associated with some recreational activities. Students should know how to operate equipment safely. Students must be familiar with laws and regulations for certain recreational pursuits. (See handout on water skiing safety rules.)

Many recreational activities are not compatible with others. Water skiers do not mix with fishermen, nor do surfers. Campers and hikers do not mix with hunters.

TEACHER PREPARATION

Information about population figures can be obtained from the U. S. Census available at your County office. Your County's Land Use Plan will be helpful for the student's research. The Coast Guard publishes pamphlets for boating safety and water safety. Duplicate copies of water skiing safety rules for each student.

ACTIVITIES

I. Planning for Recreational Activities and Needs

a. Allow students to write types of recreational activities available in your community on the board.

b. Allow students to write types of recreational activities they would like to see made available in your community.

c. The students should research and find the total population of the community, population of school age children, and population of retired adults.

d. The students will develop a list of recreational activities for different age groups.

e. Start a class discussion of problems and conflicts among recreational activites.

f. The students should vote on which new recreational activity they will build in the community.

g. Have the class draw an aerial map of your community and sketch in the existing recreational activities in blue and the proposed recreational activities in red.

II. Interviewing Recreational Businesses

a. Divide the students into groups of four to interview recreational business owners/managers. (Bicycle shops, boating stores, dive shops.) Questions should be directed at services their businesses offer to tourists and citizens of their county.

b. Students should develop their questions before visiting the businesses.

c. Let students photograph the interview and business for a visual display board.

d. The students will report on the recreational businesses to the class.

III. Films

a. Town and County Recreation, 1957, 20 minutes, color.

b. Ski-Ways to Safety, 1963, 13 minutes, color.

Both films may be ordered through your public library from the North Carolina State Library.

QUESTIONS

1. What recreational facilities would you plan to establish in your community?
2. List factors you consider in selecting recreational sites?
3. Describe the different needs of recreation for different age groups.
4. What natural resource in your area could be used for recreation?
5. What recreational needs exist in your community?
6. Who plans the recreational activities in your community?
7. How can you improve the recreational activities in your community?
8. Which recreational activities do you participate in with your parents?
9. Do students in your community participate in planning recreational activities?

LESSON NUMBER: 9

COMMUNITY PLANNING AND THE ENVIRONMENT

"HARBOR TOWN"

KEY CONCEPT

The interdependence of man and his environment is an important facet in community planning.

COMPETENCY GOALS

1. The learner will know that people and their environments are interdependent.

2. The learner will know that change affects the lives of people.

OBJECTIVES

1. The student will be able to weigh advantages and disadvantages of changing the environment.

2. The student will be able to make decisions on what changes will take place in the community.

MATERIALS

game board
voting record
proposed development cards
role cards

BACKGROUND INFORMATION

Harbor Town is designed to teach students the importance of environmental considerations in community planning.

> "All elements of the environment are interrelated and interdependent. When man changes the environment, it has consequences not only for himself, but for other forms of plant and animal life, and for the soil, air and water."

Harbor Town has several different areas open for development. Each student will be assigned to a role. The role may be human, animal or a natural resource, such as a forest. The students will be presented with proposals for development. The students discuss

possible consequences from the viewpoint of the roles they have. If the majority of the class vote to add the proposed development, it is added to the game board.

TEACHER PREPARATION

1. Make a game board for Harbor Town using the pattern provided, 9.1, and an opaque projector or an overhead projector. Allow several students to add color to the game board. Laminate for a more permanent game.

2. Cut out the illustrations of the proposed developments, supplementary sheets 9.2 and 9.3. Color and laminate. Cut out and laminate the role cards, 9.7 and 9.8.

3. Cut out the fact cards, 9.4, 9.5, and 9.6, along the broken lines. Fold each in half along the solid line and laminate to make cards.

ACTIVITIES

I. Harbor Town Game

   a. By playing this game, students will be able to decide which changes may occur in their town by discussing and voting.

   b. Place the Harbor Town game board at the front of the class. Point out features of the area--pine forest, streams, ponds, town, live oak forest, marshland, sound, and beach.

   c. Divide the class into eleven role teams as indicated by the eleven role identification cards. Tell each team to vote on each proposed development as if they were the people, animal or resource as stated on the role cards. Each team will have one vote.

   d. Show all the proposed development illustrations. Choose one project at a time for discussion and voting.

   e. Position the proposed development illustration beside the game board. Explain to the class: "It has been proposed that Harbor Town designate and/or develop a _____."

   f. Read to the class the Fact Card for the proposed development.

   g. The teams should discuss openly, but orderly, for five minutes the effects this project will have on their role, the environment and the future.

   h. When the time is up, call a spokesman from each team to give the team's vote and ample reasons for their decision. Record each vote on the score sheet, supplemental sheet 9.9.

i. If the majority vote to develop the project, accept two nominations for the location. Discuss the effects the developments will have on the role teams for each location.

j. Vote on the site for the development and place the illustration on the game board using double-faced tape. Record the location on the tally sheet.

k. Continue the same procedure with the other proposed development projects until the class has discussed and voted on each one.

REFERENCE

Man In His Environment. "Make Your Own World." Coca-Cola, USA.

WANCHESE HARBOR FILMSTRIP PRESENTATION

Frame #	Description	Text
1	WANCHESE HARBOR COMMUNITY DEVELOPMENT	State, federal and community planning has been an important factor in the development of the Wanchese Seafood Industrial Park.
2	Artist's conception	The Seafood Park will provide access, docking, waste water treatment and electric facilities for the harbor, seafood processing and fishing industries.
3	Painting of trawler	The goals of the Seafood Park are to develop a major commercial seafood handling, processing and distribution port in North Carolina. . .
4	Fisherman	. . .and to provide a home port with support facilities for a commercial fishing fleet.
5	Marsh	The enlargement of the harbor and development of the Seafood Park has destroyed many acres of marsh wetlands.
6	Pelicans ENDANGERED SPECIES	The Environmental Impact Statement identified several endangered species that are found in the project area.
7	Trawler	The old Wanchese Harbor served as port for many fishing vessels that utilized the Atlantic Ocean from New England to Florida.
8	Several trawlers	Often the old harbor became too crowded for safe navigation in severe weather when boats sought refuge.
9	Oregon Inlet	The Wanchese Harbor is located 9 miles from Oregon Inlet.
10	Trawler sinking	The many accidents and wrecks at the inlet has led fishermen to demand stabilization of the inlet.

11	POLLUTION	Waste products and sewage from the fishing industry has polluted the water of the harbor.
12	Waste Treatment facility	The waste water treatment facility at the Seafood Park will handle domestic sewage and seafood by-products.
13	Small boat at dock	North Carolina's commercial fishing fleet has been dominated by small boats and vessels up to forty feet in length with crews of one or two fishermen.
14	Trawler with nets	Several commercial fishermen have started corporations and have built trawlers over 40 feet.
15	Sorting fish on boat	North Carolina's commercial fishermen take a variety of species which change with seasonal abundance.
16	Boat loaded with fish	The fishermen take their haul to the fish house to sell the catch, either to be processed in the area or sent to markets out of state.
17	Fish house employee	The fish are sorted by size, weighed. . .
18	Boxes of fish	. . .and packed in boxes with ice. . .
19	Fish truck with boxes	. . .to be shipped by trucks to northern markets.
20	Fulton market	Fulton Fish Market in New York City is where much of North Carolina's commercial catch is. . .
21	Fish buyers	. . .sent to be sold. Fulton market opens before dawn and has. . .
22	Scallops	. . .most of the fish sold before 10:00 in the morning.
23	Red snapper	A variety of seafoods are seen at the Fulton Market such as red snapper. . .

24	Swordfish	. . .swordfish. . .
25	Flounder	. . .and flounder.
26	Commercial package	Some of North Carolina's seafood is processed and packaged in the coastal areas.
27	Processing seafood	Shellfish such as shrimp and crabs go through several processing steps.
28	Seafood market	The processed seafood is sold wholesale to local seafood markets. . .
29	Restaurant	. . .and restaurants.
30	Wanchese sign	Wanchese is a small community on Roanoke Island in Dare County, North Carolina.
31	Women and nets	The primary occupations of Wanchese residents has been fishing. . .
32	Wooden boat building	. . .and boat building.
33	Boat on racks	
34	Launching new trawler	
35	Job sign	It is hoped that the Seafood Industrial Park will help bring economic stability to the area.
36	Crane	Construction of the Seafood Park facilities. . .
37	Barge	. . . has generated employment.
38	State port	Some of the processed seafood will be sent to deepwater ports. . .
39	Cargo ship	. . .for cargo shipping.
40	RECREATION	When new families move into the area for jobs. . .
41	Fisherman	. . .recreational needs will increase and plans must be made. . .
42	Mini golf	. . .as to what type of recreational activities will be built.

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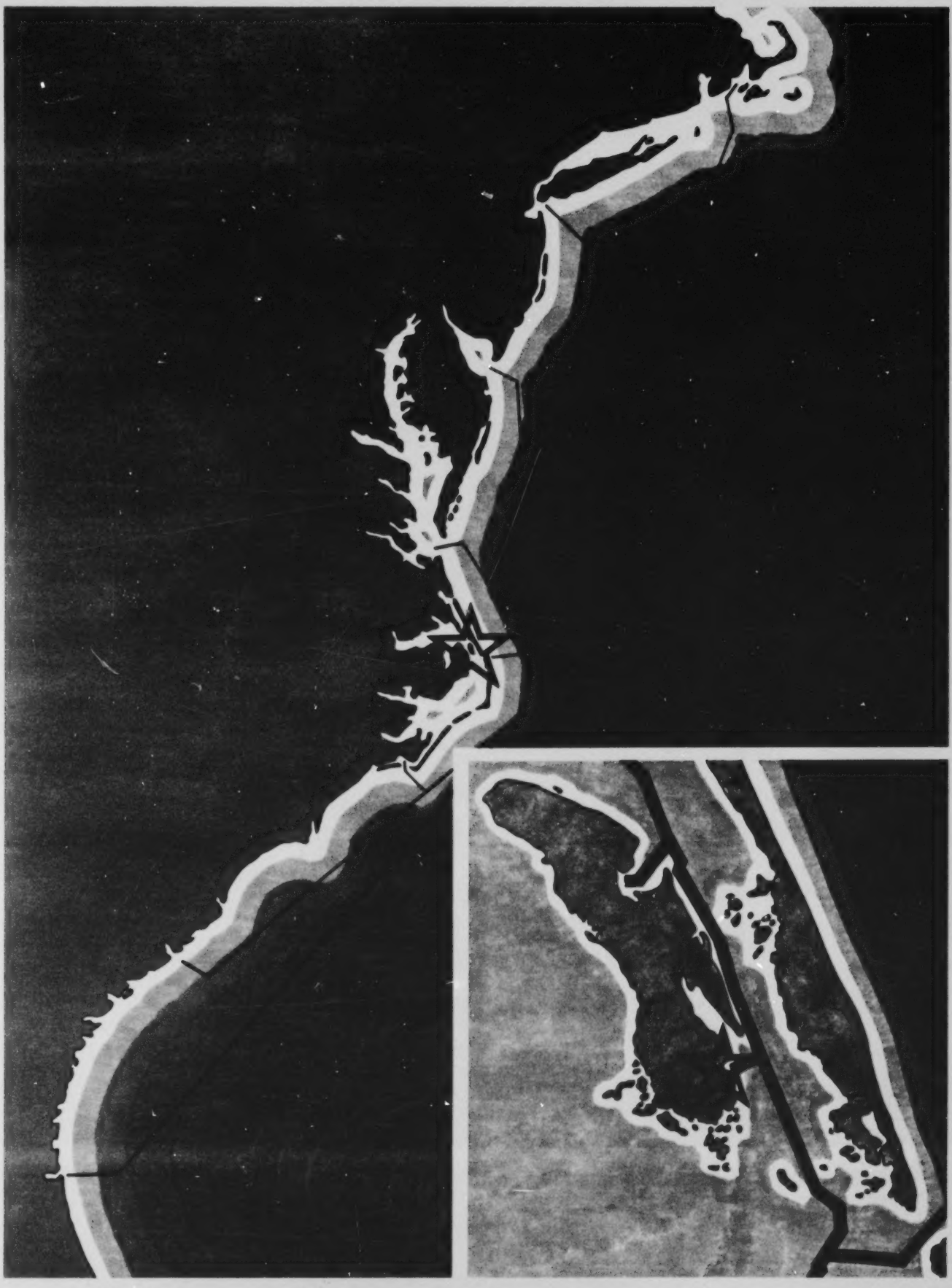
Dare County Board of Education
Manteo, North Carolina

Wanchese seafood industrial park

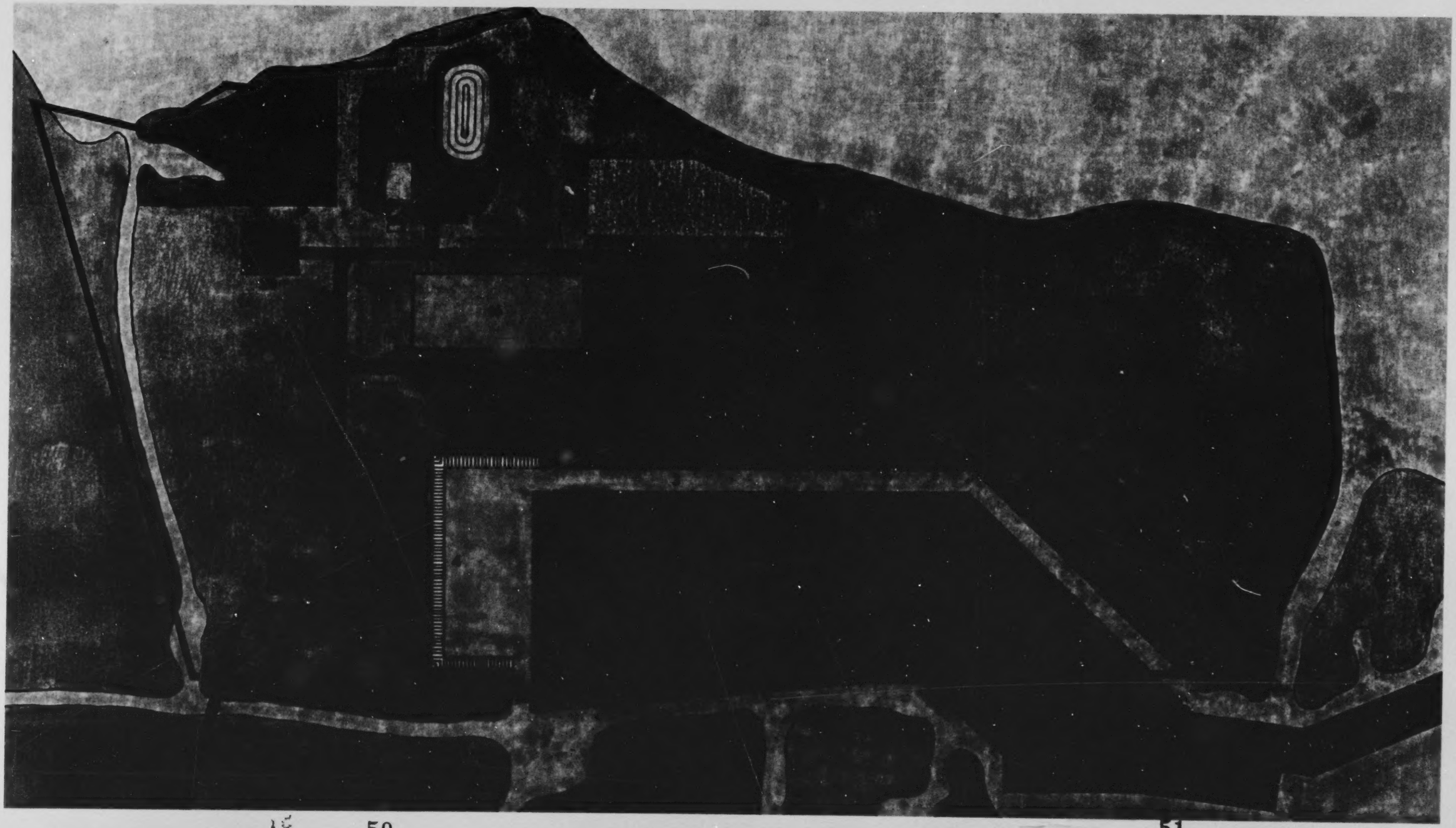
WANCHESE HARBOR - NORTH CAROLINA: The only Federal, State and County-financed project devoted entirely to the seafood processing and fishing industries.



WANCHESE SEAFOOD INDUSTRIAL PARK

Below is the site plan for the Wanchese Harbor Development Project:

1. Channel
2. Harbor
3. Bulkhead and Docking
4. Future Docking
5. Engine Repair
6. Frozen Seafood Packaging
7. Frozen Seafood Packaging
8. Frozen Seafood Processing
9. Frozen Seafood Processing
10. Ice Plant
11. Refueling Area
12. Fuel Tank Facility
13. Gear Storage
14. Water Tank & Control Vault
15. Engine and Electrical/Electronic Repair, Trawler Supply, Shipping and Packaging Material Warehouse
16. Cold Storage and Freezer Facility
17. By Product Handling Area
18. Waste Treatment Plant
19. Permanent Spoil Area
20. Well and Pumphouse
21. Electric Substation



WANCHESE SEAFOOD INDUSTRIAL PARK

WANCHESE HARBOR • NORTH CAROLINA

LOCATION:

On Roanoke Island, Dare County, off the coast of North Carolina, at the center of the Atlantic Seaboard.

MAJOR FEATURES:

To provide a home port with support facilities for commercial fishing fleets • To provide access, docking, water, waste treatment and electric facilities for the harbor, seafood processing, and fishing industries • To provide all receiving, processing, distribution and marine services for major seafood firms • Built to accommodate the modern fishing industry of today and tomorrow.

LAND ACCESS:

Roanoke Island and Wanchese Harbor are served by U.S. Highway 264 joining U.S. 17 at Washington, N.C., U.S. 64 joining U.S. 17 at Williamston, N.C., and U.S. 301/I-95 at Rocky Mount, N.C. Wanchese is also served by U.S. Highway 158 joining U.S. 17 at Elizabeth City, N.C. and U.S. 13 at Ahoskie, N.C. North Carolina State Road 345 connects Wanchese with U.S. 64/264. ALL EASTERN SEAFOOD MARKETS CAN BE SERVED BY OVERNIGHT TRUCK DELIVERY FROM WANCHESE.

AIR ACCESS:

Convenient all-weather airport at Manteo, just 10 miles north of Wanchese.

EXPORT CONVENIENCE:

Located near deep water ports and International air-export facilities.

CONCEPT:

The State of North Carolina will lease space and provide basic services to selected firms for construction of seafood and marine related industries in a major commercial seafood handling, processing and distribution port . . . the WANCHESE SEAFOOD INDUSTRIAL PARK. The multimillion dollar project will be financed by the State of North Carolina and Dare County with federal assistance.

Private financial assistance to participating firms may be arranged through the North Carolina Department of Commerce. This will be the only Industrial Park devoted solely to the Seafood Industry. Interior roads, parking and building construction areas will be provided and maintained by the state.

UNIQUE ADVANTAGES:

1. Skilled manpower experienced in every phase of the Marine Industries.
2. Police and fire protection, sanitation services, water, EPA approved waste treatment. (No permit procedure required.)
3. At-hand source of supply for equipment, parts, delivery facilities, and market data.
4. Easy access to the richest mix of cold and warm water fin fish and shellfish on the Atlantic Seaboard.
5. North Carolina offers executives and employees its year-round moderate climate; superb educational, cultural and recreational facilities; lower taxes; lower utility costs; excellent home and rental values; and the friendliness and hospitality for which North Carolina is famous!
6. The Wanchese Seafood Industrial Park is designed to become the Wholesale Supermarket of the Industry.

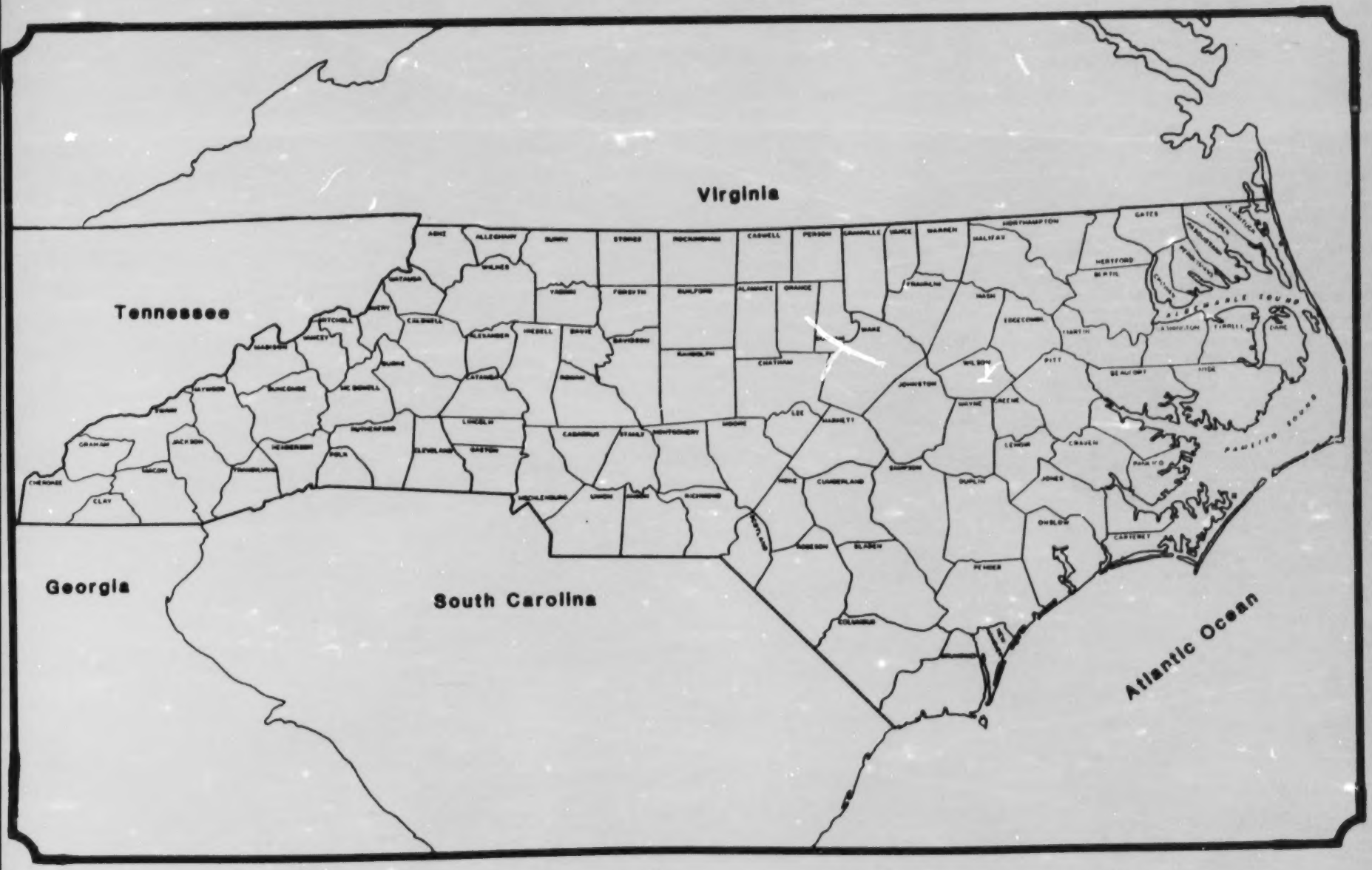
WANCHESE SEAFOOD INDUSTRIAL PARK

A new concept in the development of
America's Commercial Fishing Industry.

Seafood Receiving ☐ Seafood Processing ☐ Cold Storage/ Freezing Operations ☐ Ice Manufacturing and Storage ☐ Fuel and Oil Storage ☐ Packaging Material Distribution ☐ Electronic Equipment Sales and Service ☐ Engine Sales and Service ☐ Marine Suppliers ☐ Marine Railway and Vessel Repairs ☐ Ship-building ☐ Marine Construction ☐ Refrigerated Truck Transport ☐ Complete Fish Processing

For additional information and project timetable,
write or call (in strict confidence) to:

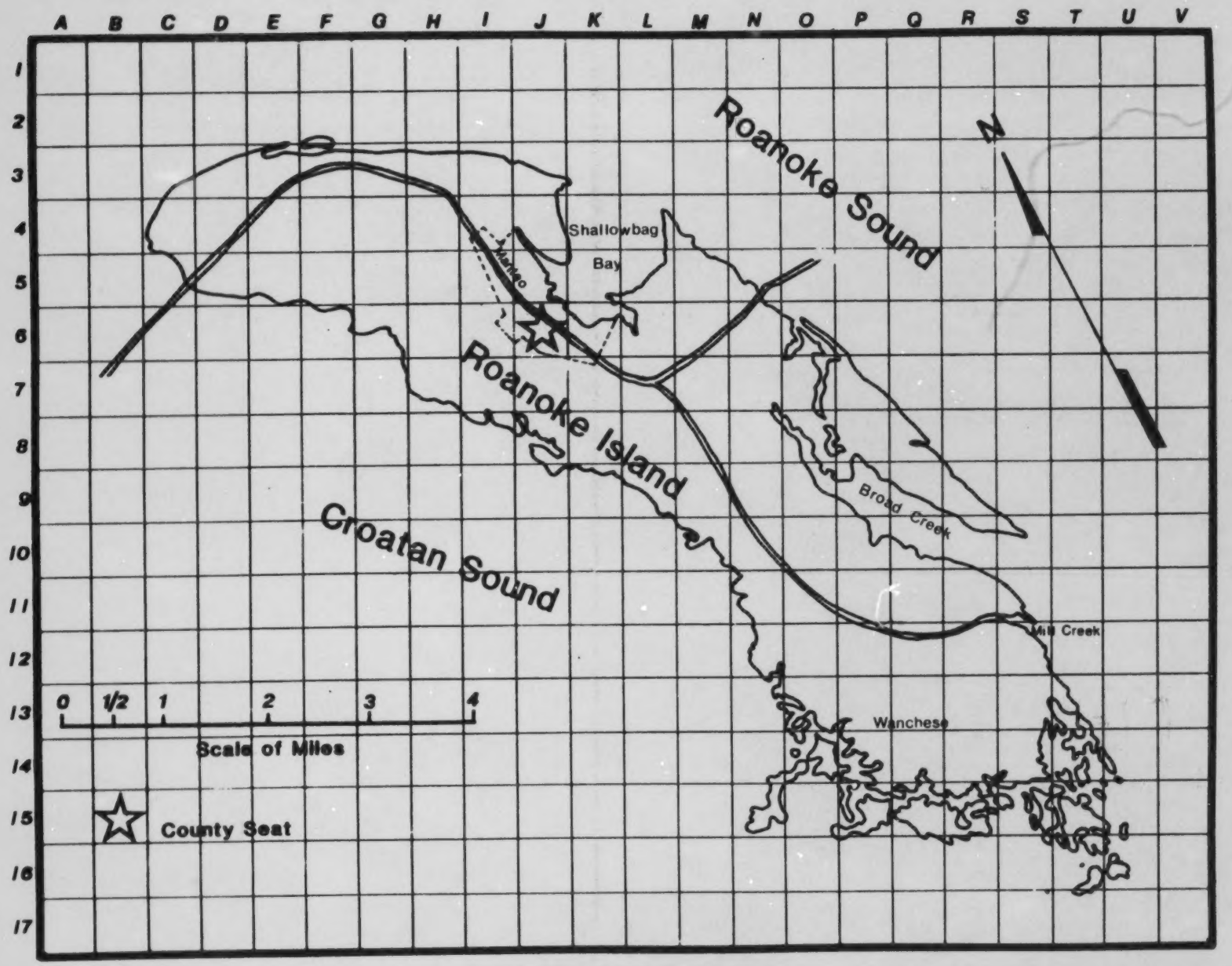
North Carolina Department of Commerce
430 North Salisbury Street
Raleigh, North Carolina 27611
Tel: (919) 733-4151



Map of North Carolina

808
1.1

Map of Eastern North Carolina


A B C D E F G H I J K L M N O P Q R S T U V
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17
Roanoke Sound
N
Shallowbag
Bay
Manteo
Roanoke Island
Croatan Sound
Broad Creek
Mill Creek
Wanchese
0 1/2 1 2 3 4
Scale of Miles
County Seat

MAP OF ROANOKE ISLAND

SOC 1.3

map questions name_____

1. North Carolina is bordered by the state of _____ on the north.

2. North Carolina is bordered by Tennessee on the _____.

3. North Carolina is bordered by South Carolina on the _____.

4. The _____ _____ borders North Carolina on the east.

5. List the counties that border Dare County.

6. List the bodies of water that border Dare County.

7. List the bodies of water that surround Roanoke Island.

8. Name the county seat of Dare County. _____

9. Name the unincorporated community on the southeastern part of Roanoke Island. _____

10. Broad Creek is located in quadrants _____, _____ and _____.

11. Mill Creek is located in quadrants _____ and _____.

12. The Seafood Industrial Park will be located on the peninsula in quadrants _____ and _____.

GULL HAVEN BACKGROUND AND ROLES

Teacher: "James Edwards, former mayor of Gull Haven, has deeded in his will, 50 acres of land to the small fishing village. The 50 acres is on the peninsula between Pine Creek and Openwater Bay, just across the creek from Gull Haven Harbor. The land is comprised of marsh wetlands with several large stands of pine forest and beaches on the eastern side. The peninsula has a variety of habitats with abundant wildlife. Important oyster beds are located at Crab Point."

ROLE 1: Council member Smith is owner of the Gull Haven Crab Processing House and owner of 2 fishing trawlers. Mr. Smith knows that the federal government is spending money to improve fishing fleets and modernize the seafood industry. Mr. Smith wants to develop a new Seafood Industrial Park for Gull Haven on the Edwards property with federal money.

ROLE 2: Council member Johnson is a former member of the State Utilities Commission. Mrs. Johnson believes the electrical utilities at Gull Haven are insufficient for the continuing growth of the town. She also believes the town should build a waste water and sewage treatment plant on the Edwards property.

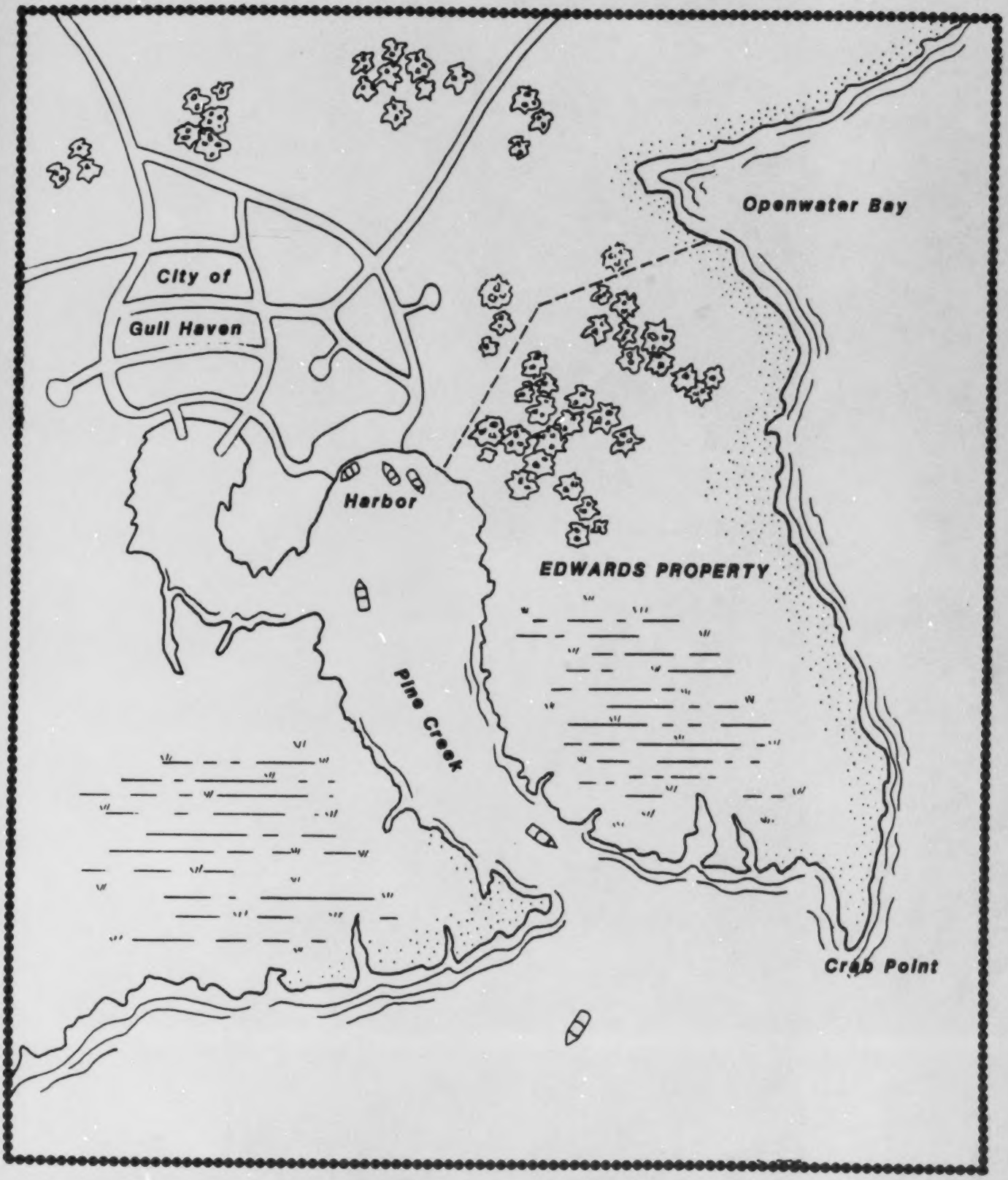
ROLE 3: Council member Davis owns Gull Haven Real Estate Agency. Mr. Davis believes the town should build motels and apartments and collect rent. Mr. Davis suggests that one of the town's real estate agencies manage the motels and apartments.

ROLE 4: Council member Brown owns a sporting goods and fishing tackle shop. Mr. Brown wants the Edwards property turned into a hunting/fishing reserve and family recreational center.

ROLE 5: Council member Greene is a retired college biology professor. Dr. Green believes that the marshes and forest on Edwards property have unique habitats for rare and endangered animals. She believes the land should be turned into a wilderness park.

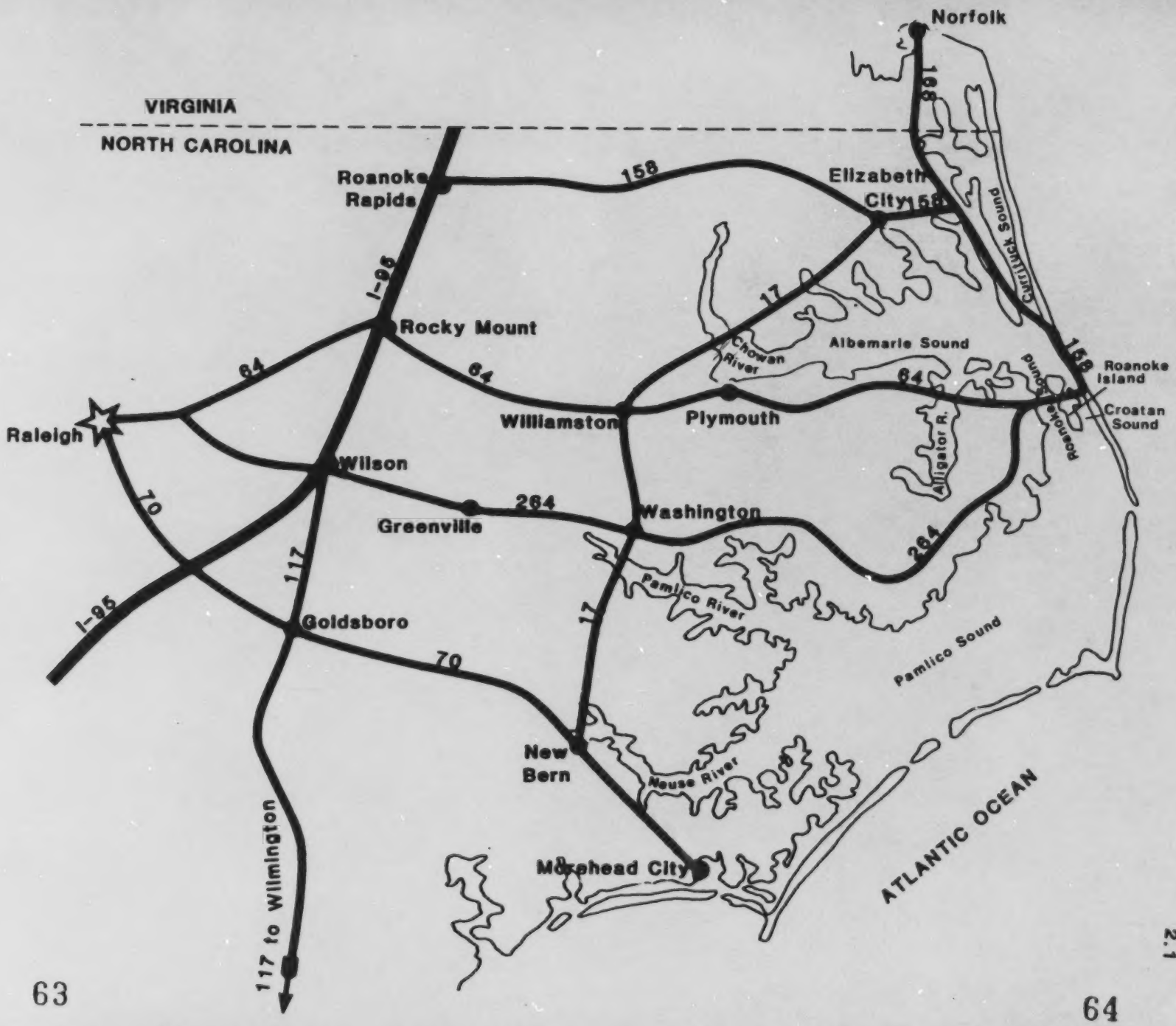
ROLE 6: Council member Thompson owns a grocery store. Mr Thompson thinks the town should develop a shopping center because business is declining in downtown Gull Haven.

GULL HAVEN MAP



GULL HAVEN BALLOT SHEET

	YAY	NAY
1. Seafood Industrial Park		
2. Waste Water Treatment Plant		
3. Motels and Apartments		
4. Recreational Site		
5. Nature Preserve		
6. Shopping Center		


Norfolk
VIRGINIA
NORTH CAROLINA
Roanoke Rapids
158
Elizabeth City
158
Currituck Sound
I-95
17
Rocky Mount
Albemarle Sound
Chowan River
64
64
64
158
Roanoke Island
Croatan Sound
Raleigh
Williamston
Plymouth
Alligator R.
Wilson
264
Washington
Greenville
264
70
117
17
I-95
Pamlico River
Goldsboro
70
Pamlico Sound
New Bern
Neuse River
117 to Wilmington
Morehead City
ATLANTIC OCEAN
63
64
SOC 2.1

ROUTING SEAFOOD TO MARKET

1. List the bodies of water around Roanoke Island.

2. Which highways can trucks use to reach the mainland from Roanoke Island?

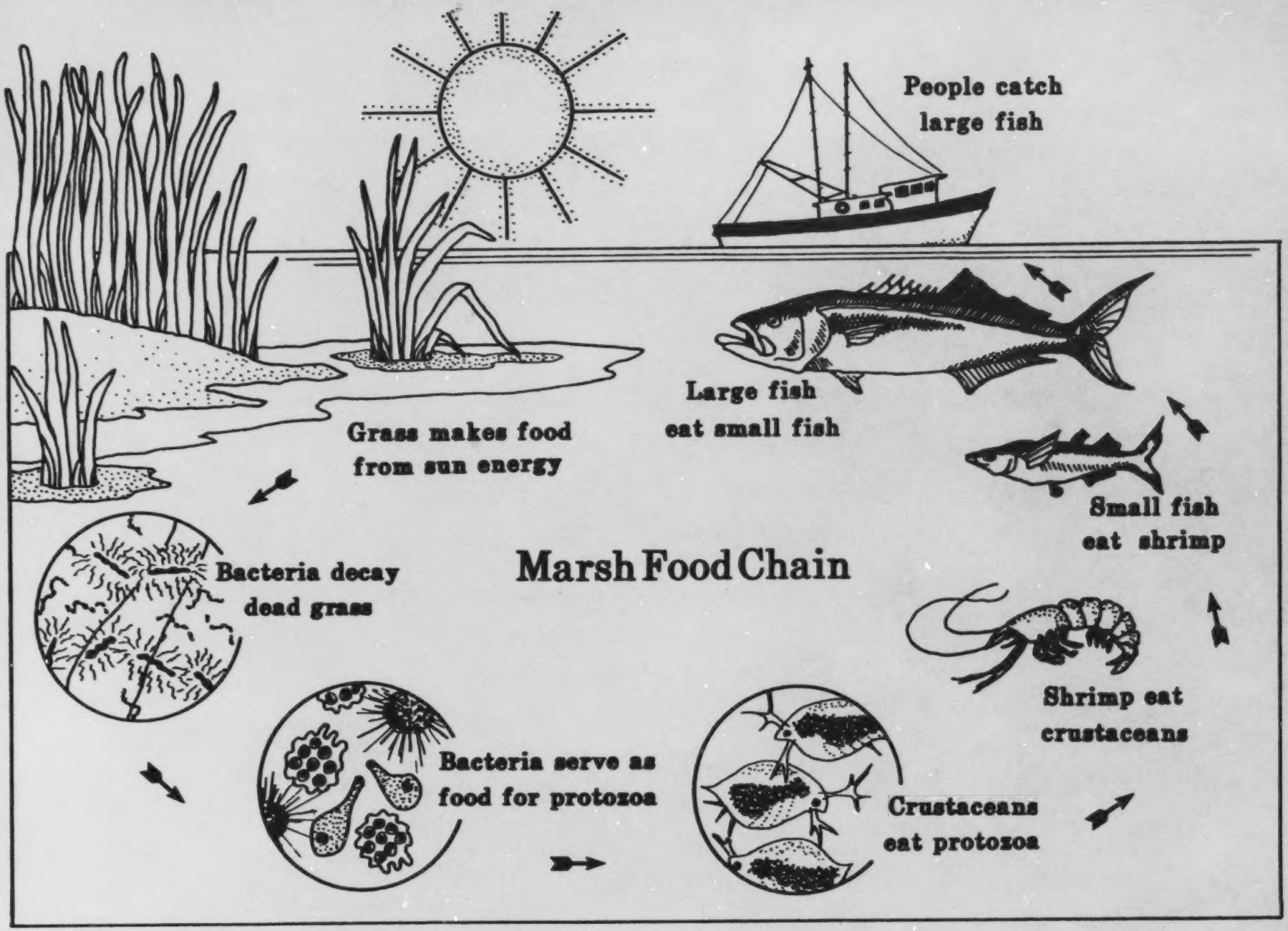
3. Odd numbered highways run _____ and _____, even numbered highways run _____ and _____.

4. List two ports from which processed seafood can be shipped.

5. A restaurant chain in Rocky Mount, Williamston and Roanoke Rapids is buying processed fish. What routes will the driver take?

6. What routes will truck drivers take to get the processed fish to a port for shipping?

7. What bodies of water will truck drivers cross to get to the market in Goldsboro if they go through Williamston, Washington and New Bern?


People catch
large fish
Large fish
eat small fish
Grass makes food
from sun energy
Small fish
eat shrimp
Marsh Food Chain
Bacteria decay
dead grass
Shrimp eat
crustaceans
Bacteria serve as
food for protozoa
Crustaceans
eat protozoa

Sample Endangered Species Card

LOGGERHEAD TURTLE

DESCRIPTION: Large sea turtle, has large head and blunt jaws. Upper shell and flippers reddish-brown; lower shell is yellow. Front flippers have 2 claws. Three large plates on both sides of body between upper and lower shells.

HABITAT: Lives in open ocean waters, lagoons, salt marshes and mouths of large rivers. Feeds mainly on snails, clams, shrimp, crabs, fish and some plant material.
Nesting: April-October. Average 126 eggs. Hatch 55-70 days.

RANGE: Found in temperate and subtropical waters worldwide. Nests from New Jersey southward, fairly common along North and South Carolina coasts from late April to mid-November.

ENDANGERED SPECIES WHICH MAY BE

FOUND IN PROJECT AREA

Common Name	Scientific Name	Range in North Carolina	Preferred Habitat/Comments	Abundance
		Reptiles		
Loggerhead turtle	Caretta caretta	Sea turtles of N.C., only loggerhead known to nest on N.C. coast	Open ocean, but lay eggs on sandy beaches	Endangered
Green turtle	Chelonia mydas			
Leatherback turtle	Dermochelys coriacea			
Hawkshill turtle	Eretomochelys imbricata			
Ridley turtle	Lepidochelys kempii			
American alligator	Alligator mississippienses			

SOC 3.3

ENDANGERED SPECIES WHICH MAY BE

FOUND IN PROJECT AREA

Common Name	Scientific Name	Range in North Carolina	Preferred Habitat/Comments	Abundance
		Birds		
Brown pelican	Pelecanus occidentalis	Uncommon local resident along coast	Coastal fringe, sounds and inlets Nests on low islands, in Ocracoke Inlet only. Production 1972, about 40 young.	Endangered
Bald eagle	Haliaeetus leucocephalus	Rare local resident along coast, rare visitor elsewhere	Shores and sounds and large lakes. Last known nesting site in N.C. now unproductive.	Endangered
Peregrine falcon	Falco peregrinus	Uncommon to rare winter visitor along coast	Coast, mountains and woodlands. Nests on cliffs. East U.S. breeding population nearly extirpated	Endangered
Red-cockaded woodpecker	Dendrocopus borealis	Uncommon to rare local resident coastal plain and extreme e. piedmont.	Requires extensive pine forest infected by fungus, Fomes pini.	Endangered

SOC 3.4

Excerpts from Final Environmental Statement Wanchese Harbor Development Project

4.00 PROBABLE IMPACTS OF THE PROPOSED ACTION ON THE ENVIRONMENT.

4.01 Social and Economic Impacts. It is a major objective of the State of North Caroina to develop and operate the Seafood Industrial Park so as to gain optimum economic benefits for Wanchese and a multi-county region, without sacrificing any of the social and aesthetic values that make the Wanchese community a pleasant and desirable place to live. The basic character of Wanchese and the quality of life therein will not be significantly changed. Most or all of the 640 new jobs will be filled by persons who now reside in the Wanchese community or in adjacent counties within commuting distance of Wanchese who are currently seasonally employed or unemployed. It is not anticipated that public opinion will adversely influence the project, but rather will help insure development compatible with existing life styles. It is highly unlikely that project implementation will result in a "boomtown syndrome" in or around Wanchese. If undesirable growth or development should threaten to occur, Dare County will take necessary steps to curtail and control it. The thrust of such growth and development is along the Outer Banks, 6 to 20 miles from Wanchese, where the opportunities for speculative profits are much greater. Implementation of the proposed enlargement of the port of Wanchese by the State of North Carolina will have a number of significant social and economic effects on the project area. The primary impacts of the project will result from improved harbor facilities and provisions for construction of seafood processing facilities. Realization of benefits from these improvements are contingent upon the quantity of fish available and the quantity subsequently landed at Wanchese.

The proposed action will not result in the forced relocation of any persons. Major social and economic impacts are detailed below.

4.01.1 Population. Population changes will probably be induced in Dare County and the four-county area due to the project. It is anticipated that in Dare County there will be a 2.1 percent increase over previously projected population levels in 1980; a 3.0 percent increase in 2000; and a 3.2 percent increase 2030. In the four-county area population change attributable to creation of primary and secondary employment is projected at a rate of 138.7 immigrants per 100 primary and 25 secondary jobs created, resulting in a 1.1 percent increase in total projected population in 1980; a 2.0 percent increase by 2000; and a 2.7 percent increase by 2030.

4.01.2 Employment. The implementation of the proposed modifications to Wanchese basin will result in the improvement of nagivation and existing port facilities. The future construction of additional handling facilities for fishery products at Wanchese is dependent upon the proposed enlargement. The proposed action will ultimately result in the creation of additional primary employment in Wanchese and will induce secondary employment in both Dare County and the balance of the four-county area -- the State has estimated that implementation of the Master Plan of Development for Wanchese Harbor will provide approximately $30 million in capital investments and approximately

640 new jobs (State of North Carolina 1976). Creation of these jobs would serve to stabilize the current seasonal employment/unemployment caused by the recreation-based industry in the county. Primary employment would include employment associated directly with the handling and processing of marine fishery products. Secondary employment would include employment associated with service facilities at Wanchese plus other employment created as a result of the additional primary employment. Examples of secondary employment would include vessel maintenance, shipyard employment, additional municipal and county employees, teachers and professionals, and additional retail and wholesale employment.

4.01.3 Navigation and Commercial Fisheries. The enlargement of Wanchese Harbor and the subsequent development of the area planned by the State, in conjunction with continued Federal maintenance of Oregon Inlet and associated maintenance of the Oregon Inlet to Wanchese channel, will have a major impact on navigation and commercial fisheries of the area. The present lack of adequate harbor facilities at Wanchese and reliable access through Oregon Inlet, require the majority of vessels fishing off North Carolina to resupply and off-load at some port other than Wanchese. The larger basin will allow more vessels to be based in the area. Subsequent development of seafood processing, distribution, and off-loading facilities will provide incentive for non-Wanchese based vessels to land their catch at Wanchese at least part of the time. According to local interests, vessels from other ports would land approximately 25 percent of their catches at Wanchese if adequate harbor and processing facilities are available.

The proposed action will also promote the use of Wanchese as a port of refuge during storms. According to information obtained from the National Marine Fisheries Service, 100 to 125 vessels presently operate off Oregon Inlet, approximately 92 of which are from ports other than Wanchese. These vessels are expected to use Wanchese as a harbor of refuge up to 4 times annually with an average of one time per year. Wanchese-based vessels make four trips annually to the alternate ports of Hampton or Norfolk, Virginia, some 80 additional miles, to find a harbor of refuge. Use of Wanchese as a refuge during storms will increase total fishing time for Wanchese-based vessels by allowing them to return to the fishing grounds one day earlier following a storm for an average of four times per year. Using the average daily landings for a typical vessel, each additional day of fishing resulting from the harbor enlargement (assuming continued maintenance of the inlet) would represent an average of 3,000 pounds of seafood. Reliable access and adequate harbor facilities will also provide the needed incentive for industry to invest substantial capital in the new vessels required to expand operations and to operate at optimum efficiency.

4.01.4 Infrastructure. Dare County public facilities are presently subject to the vagaries of changing populations related to the seasonal recreational industry. Summertime recreational populations in the Dare County area are three to four times the year-round permanent populations. In many cases, public facilities are not adequate to meet the peak demand.

Implementation of the proposed modifications to Wanchese Harbor will have a marginal effect on the projected year-round population growth. Accordingly, implementation of the project will not have a significant impact on increased demands for public facilities such as housing, schools, or public services, nor will mitigation be necessary.

4.01.5 Water Supply and Wastewater Disposal. The region in which Wanchese is located obtains its water supplies from groundwater sources, which are under continuing investigation. The results of investigation to date indicate that a sufficient quantity of good quality groundwater can be obtained to support project operations without endangering existing resources.

It is not anticipated that the total water demand on the project's water supply system will ever equal or exceed the capability of the supplying aquifer, nor that the ultimate maximum demand will endanger either the groundwater resources or the rights of other users or potential users of these resources.

The quality of water in Wanchese Basin (Mill Creek) will be improved by operation of the wastewater collection and treatment and disposal system that the project will provide.

4.01.6 Transportation. Project implementation will result in a greater number of fishing vessels operating in and out of Wanchese Harbor. It will involve no cargo vessels (freighters). Processed seafood will move by highway to distribution centers and to other ports for shipment overseas. The existing highway net will support the anticipated shipment of processed goods from Wanchese. Some road congestion may result from commuter traffic. However, this congestion, if it occurs, will be relatively light and will not require the construction of new roads into the Wanchese community.

4.02 Environmental Impacts. Pipeline dredging will be utilized to enlarge and deepen the basin at Wanchese. Environmental impacts resulting from such dredging and associated disposal operations can be considered in two categories: those that directly affect the dredge and disposal sites and those that indirectly affect surrounding environments. Both categories of impacts are discussed below in terms of the affected elements. In addition, environmental impacts of associated development of the access road are included. In general, impacts associated with dredging appear to be of short-term duration and of minor consequence.

4.02.1 Direct impacts on the dredged site. The proposed dredge site consists of approximately 2.5 acres of existing basin (to be deepened to -14 ft mlw) and 10.0 acres of wetland area comprised primarily of Juncus marsh and 2.5 acres at higher elevation dominated by pond pine, marsh elder, and various shrub and herbaceous species. Impact on the dredge site will involve total loss of the existing land surface and bottom substratum and all sedentary or slow moving benthic organisms on or in the substratum to

the depth of the cut (Boyd et al. 1972). The existing basin has no commercially valuable shellfish beds and loss of benthos from dredging operations is expected to be minimal, but total. It is probable that sediments of the newly dredged basin will be similar to those previously removed and newly developed biotic communities, recruited from adjacent undisturbed areas, should approximate those lost during dredging. The time involved in recolonization and in the attainment of the particular stage of community succession previously achieved is dependent upon a complex of factors that are variable, depending on locale. Under most conditions, this recovery period will be from one to two years (Boyd et al. 1972).

Dredging will destroy a 12.5 acre area comprosed of wetlands and tree/shrub community and will result in a drastic land change -- land an average of 3.0 ft above local low water will be cut to -14 ft mlw. Since contiguous terrestrial habitats are likely to already be at carrying capacity, movement of animals from the disrupted area to adjacent areas will not increase the number of animals able to survive in the newly invaded habitat. The animal population in the newly invaded habitat would be expected to return to its numbers prior to invasion in short time. Therefore, a net decrease in the animal population would occur with construction of the project.

Dredging will destroy 10.0 acres of black needlerush marsh (Juncus roemerianus). Measurements of the primary production of Juncus have been made in the past and range from 560 g dry weight (productivity)/m^2/yr to 1361 g dry weight (productivity)/m^2/yr (Marshall in Odum et al 1974). The latter value was measured at Bodie Island, N.C. near the project area; therefore, it will be used to estimate loss of primary production as a result of the proposed action. For the 10.0 acre area the total annual loss of primary production will be 55,078 kg dry weight (productivity/yr. Kuenzler and Marshall (1973) have observed Juncus, but indicate that the data are not adequate to determine nutrient exchange between Juncus marshes and estuaries. It has been shown for Spartina alterniflora that there is a 45 percent export of net production to the estuaries (Teal 1962). Spartina is a regularly flooded marsh, while Juncus is irregularly flooded; therefore, export of net production to the estuary from Juncus is somewhat less than that of Spartina but it is not known by how much. Loss of 10.0 acres of Juncus, if the proposed action is executed, will be a long-term but unquantified adverse effect for the area.

4.02.2 Direct impacts on the disposal site. For purposes of this discussion, the disposal area and access road will be considered together, since construction of the access road is essentially a filling operation also. Disposal of dredged material in a diked area usually results in a drastic change in land use, as the character of the disposal area will be, for all practical purposes, permanently altered. The existing 6 acre diked disposal area at Wanchese, on the north side of Mill Creek, will be partially included (4.54 acres) in the 35.88 acre proposed disposal area. The permanent impact of diked disposal will be complete removal of existing flora and fauna within the construction area. If the project is constructed, disposal of dredged material and construction of the access road will result in loss of 31.84 acres of black needlerush (Juncus roemerianus) marsh

(31.34 acres for disposal and 0.5 acre for access road). This destruction will result in an annual loss of 175,367 kg dry weight (productivity)/year. Impacts discussed in Section 4.02.1 above, relative to the loss of Juncus from dredging operations apply here also. Loss of 31.84 acres of Juncus from disposal operations and access road construction will be a long-term adverse impact for the project vicinity.

Existing resident avian populations will suffer a net decrease in population as described in Section 4.02.1. Implementation of the proposed action, therefore, will not destroy valuable, unique avian habitat but will have a long-term minor adverse effect on bird populations in the region.

The mammal population of the project area consists primarily of small, marsh-dwelling rodents, furbearers, and a few transients. The marsh areas that are removed through project construction will be permanently lost to the area's present mammalian marsh inhabitants and will cause a net decrease in mammal populations in the area. Loss of habitat and concomitant decrease in populations will be a minor, long-term adverse impact.

The herpetofauna of the area will be affected by the proposed fill operations. Development activities may result in the loss of some individuals; however, the existence of any given species will not be threatened. Amphibians and reptiles are quite mobile and should effectively avoid areas being disrupted by the proposed action. Displaced individuals are expected to invade surrounding areas that offer suitable habitat; however, if those areas are at carrying capacity some short time after invasion by displaced populations, the newly invaded areas will return to pre-invasion levels. A net decrease in population will result, which will be a minor, long-term adverse impact.

4.02.3 Indirect impacts of the proposed dredging and disposal operations on water quality and existing aquatic communities. Boyd et al. (1972) reviewed literature concerned with the indirect effects of dredging on water quality and biota and concluded that:

> The indirect effects restricted to the dredging actions of the project are much more difficult to define than the direct effects. This does not mean such effects are of less significance; they could be much farther reaching, both in extent and significance. It is not possible to say whether such effects are detrimental, beneficial, or, as is more likely, a combination. The needed information is simply not available, although there is no doubt that changes do occur as a result of dredging activities.
>
> The potential for the indirect effects on biological communities is usually attributed to physical alterations of the environment due to dredging. These physical alterations include changes in bottom geometry and the creation of deepwater regions, new open water, changes in bottom substrates and habitats, alterations

in water velocity and current patterns, changes in future sediment distribution patterns, alteration of the sediment-water interface with subsequent release of biostimulatory or toxic chemicals, and the creation of turbidity clouds.

Indirect impacts of disposal are associated primarily with the effects of turbid, nutrient-rich, slurry waters on water quality downcurrent from the disposal site.

The proposed dredging and disposal activities will increase turbidity levels in surrounding water. However, turbidities induced from dredging activities are generally rather localized and of short duration and, thus, should pose no long-term threats to aquatic biota. Short-term impacts of increased turbidity are a decrease in light penetration and a corresponding decrease in photosynthetic activity and growth of plants in affected waters. Increased turbidities may also result in reduced or suspended feeding by shellfish; fish and other free-swimming organisms may avoid project area waters during construction due to increased turbidity. Silting may also adversely affect some benthic organisms, however, the project area has no commercially valuable shellfish beds likely to be affected.

Impacts on water quality from the effluent released from the diked area depend almost entirely on the type of material dredged. With the fines present in the basin at Wanchese, the turbidities may be sustained even after a period of clarification in the diked area. The effluent, however, will be returned to Mill Creek, which is currently classified SC, and should have no long-term adverse effects on the biota of adjacent waters. Turbidities in the receiving waters should be expected to return to pre-dredging levels shortly after disposal activities cease.

Another element of sediment resuspension is the release of oxygen-consuming materials, nutrients, and toxic substances into the water column. Chemical quality of sediments within the Wanchese basin is not known; therefore, this impact cannot be accurately evaluated. However, since the project area has no major point source of pollution, it is believed that no long-term adverse effects will result from dredging within the existing Wanchese basin.

The project will provide an enlarged basin, which may result in increased tidal flow throughout the basin and a subsequent increase in flushing capacity. This could result in improved water quality in the basin area.

4.02.4 Groundwater. Disposal of dredged material to what is presently marshland will have a direct, minor impact of permanent decreased groundwater storage in the unconfined aquifer beneath the site. In addition, a short-term lowering of water quality will occur in groundwater of the aquifer during dredging and disposal operations.

4.02.5 Air quality. The proposed action will have only a minor impact on air quality in the area. Construction of earthen dikes may result in a slight increase in suspended particulate matter in the immediate project area.

4.02.6 Noise and Odor. The project is not anticipated to have significant impact on noise or odor.

4.03 Cultural Resources. The proposed project will have no impact on known archaeological or historical resources in the area.

5.00 ANY PROBABLE ADVERSE EFFECTS WHICH CANNOT BE AVOIDED.

Approximately 41.84 acres of predominantly Juncus marsh will be permanently lost due to the proposed dredge and fill operations. Such a loss, as discussed in Sections 4.02.1 and 4.02., will result in a long-term decrease in export of net primary production of unknown quantity to the estuary. Dredging will temporarily increase turbidity, which will result in decreased light penetration and photosynthetic activity. A subsequent short-term decrease in primary productivity will be effected in the project area. Approximatley 2.5 acres of bottom substrate and bottom organisms will be lost due to the deepening of the existing basin. Temporary adverse effects to fish, oysters, and other shellfish, and various aquatic organisms will occur from increased turbidity levels and from silting. The proposed action will produce slightly elevated noise levels in the immediate project area, but these unusual noise levels will be temporary in nature.

6.00 ALTERNATIVES TO THE PROPOSED ACTION.

Alternatives to the proposed action consist only of the no action alternative. No alternative disposal sites were considered for the proposed permit action, since disposal of dredged material on the area northeast and immediately adjacent to the basin of Wanchese will facilitate the development of port facilities by the State of North Carolina on the filled area. In other words, this area will be utilized for disposal of material from enlarging the basin at Wanchese and then for development of port facilities by the State of North Carolina.

The no action alternative would result in the continuation of the current conditions, i.e., a 2.5 acre boat basin, at Wanchese. This alternative would eliminate any adverse environmental effects but would have severe detrimental effects on the otherwise projected socioeconomic environment of the project area. Also, the no action alternative would result in less efficient utilization of North Carolina's fishery resources.

Norfolk, Virginia or Morehead City, North Carolina may further develop as bases of commercial fishing operations in the event this project is not constructed. Wanchese, however, is closer to the productive offshore fishing grounds and vessels can save travel time and operating costs by basing their operations at Wanchese rather than at Norfolk or Morehead City. Another consideration was port development at some other location such as Stumpy Point, some 26 miles south of Oregon Inlet, on the Dare County mainland. However, Wanchese is already established as a base of operations for commercial fishing and is also the closest harbor to Oregon Inlet. Also, further development of the existing Wanchese facilities will probably result in minimal adverse environmental impact compared to such development in a currently undeveloped area.

7.00 THE RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF MAN'S ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY.

Present uses of the area relate directly or indirectly to its natural resources. Waters surrounding the project area provide habitat for fishery resources and contribute to the support of the area's sport and commercial fishing activities for which there are ever increasing demands. Increasing pressures are developing for improvements such as those proposed in the project.

Some environmental alterations will be required, having deleterious effects on some terrestrial fauna, benthic organisms and 41.84 acres of marsh. Loss of terrestrial flora and fauna and marsh will result in a minor long-term reduction in productivity of the project area. The project will contribute to the long-term economic benefit and general welfare of present and future residents of the area as well as tourists seeking economic opportunities.

8.00 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES WHICH WILL BE INVOLVED IN THE PROPOSED ACTION.

Limited quantities of benthic organisms and terrestrial flora and fauna will be lost as a result of project construction and subsequent facilities development combined. Construction will be carefully monitored to insure that losses associated with the project do not increase over and above those already described. Irreversible and irretrievalbe commitment of 41.84 acres of black needlerush (Juncus roemerianus) marsh and 7.0 acres of terrestrial habitat will occur if the proposed project is constructed. Implications of loss of these areas are discussed in Sections 4.02.1 and 4.02.2 above. A larger port is expected to afford increased fishing opportunities by attracting larger commercial fleets and recreational vessels. The project is expected to contribute to increased catches, which might contribute to a reduction of the fishery resource base. Construction of the proposed project will involve a substantial commitment of resources including financial expenditures for labor and materials. The labor required is irretrievable; however, overall benefits in the form of improved harbor facilities will more than justify usage of the necessary labor. The materials needed for construction are considered to be readily available. None of the required physical elements are known to be in short supply.

9.00 COORDINATION AND COMMENT RESPONSE.

9.01 General. Coordination of this proposed permit action is in accordance with 33 CFR Part 209, Permits for Activities in Navigable Waters or Ocean Waters. All parties known to be interested in the project were furnished a Public Notice published 14 October 1976 and a Revised Public Notice published 4 November 1976.

DATA SHEET

WATER QUALITY

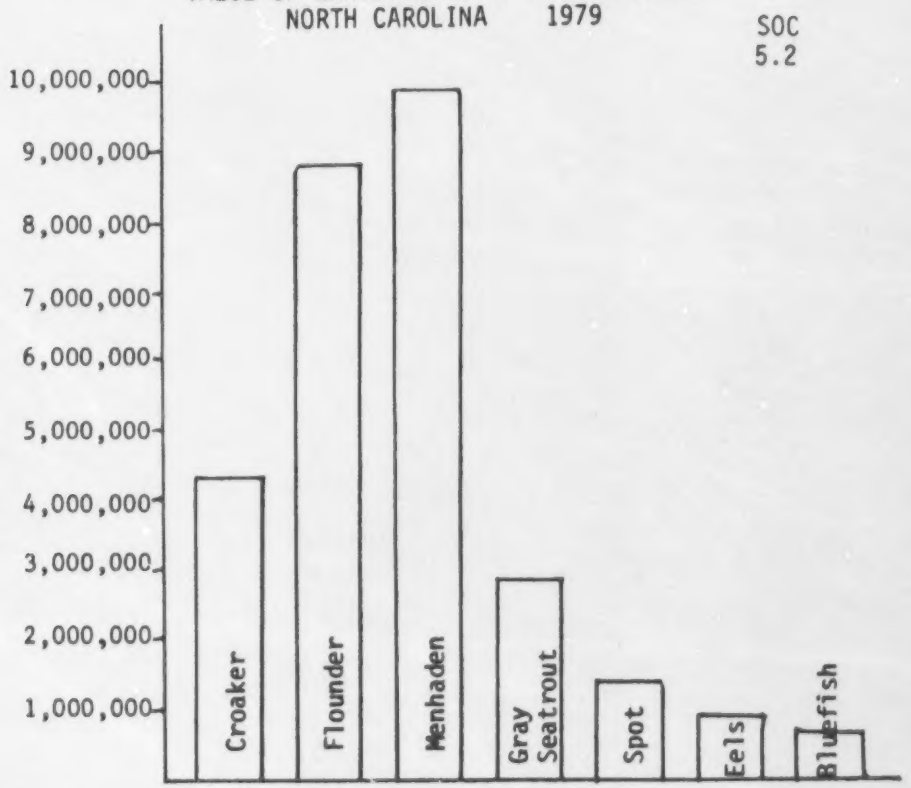
BOTTLE #	DESCRIPTION OF WATER SAMPLE	HOW TO USE THE WATER
1		
2		
3		
4		
5		

SOC 4.1

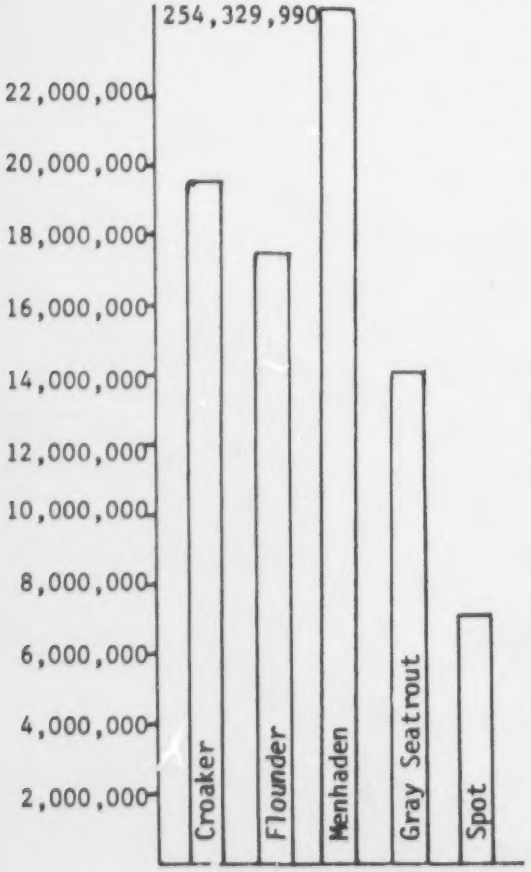
NORTH CAROLINA LANDINGS FOR 1979		
Species	Pounds	Dollars
Alewives	5,119,150	313,779
Bluefish	3,405,674	654,727
Croaker	20,558,193	4,345,433
Eels	954,534	800,529
Flounder	18,452,179	8,847,332
Grouper	675,840	456,953
Menhaden (Industrial)	254,329,990	9,918,870
Gray Sea Trout	14,759,197	2,940,319
Spot	7,303,405	1,430,017

VALUE OF LANDINGS FOR 7 FISH SPECIES
NORTH CAROLINA 1979

SOC
5.2



LANDINGS IN POUNDS
FOR 5 FISH SPECIES IN
NORTH CAROLINA
1979



UNITED STATES DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

National Marine Fisheries Service

Market News Branch

INFORMATION LEAFLET

NEW YORK "FISHERY MARKET NEWS REPORTS"

The purpose of this leaflet is to aid readers in understanding the market terms and abbreviations used in the "Fishery Market News Reports" as compiled and published by the New York Market News Office.

801 Varick Street - Room 951
New York, N.Y. 10014
TELEPHONES: (212) 620-3404-05

ABBREVIATIONS:

Due to space limitations in the market report, abbreviations are necessary. Many of these are local industry abbreviations and others have been adopted by the Fishery Market News Service. The following are some of the more important abbreviations currently in use.

Abbreviation	Meaning
(SELECTED ENTRIES)	
abt stdy	about steady
a/q	according to quality
a/s	according to size
a/s/p/q	according to size, pack and quality
bu	bushel
chow	chowder clams
drn	drawn (gutted with heads on)
f	few
fh	few higher
fl	few lower
jmb	jumbo
lmp	lump (crab meat)
ltd	limited
med	medium
mkt	market
mod	moderate
nso	not sold out
q or qual	quality
ant	quantity
rnd	round (as fish is caught)
s	some
sup	supply
#	pounds
½#	one-half pound
NC	North Carolina
L.I.	Long Island, NY
N. Bed	New Bedford, MA

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Marine Fisheries Service

FISHERY MARKET NEWS REPORT N-57
Quantities are in THOUSANDS OF POUNDS (net) and prices (SELLING not RETURNING) are for fresh fishery products of good marketable quality in cents per pound, unless otherwise stated.

Primary Wholesale Selling
Prices on Fulton Fish Market
Thursday, May 10, 1979

SALT WATER PRODUCTS:

FINFISH: Supply moderate demand light to moderate, market about steady; Quantity of fish unloaded too late for the market.

(SELECTED ENTRIES)

BLUEFISH: Sup mod. mkt abt stdy. nso. NC rnd med 45-50 a/qual, drn lge a 40.
BONITO: Sup very lt. NC ask 50.
EELS, COMMON: Sup very lt. Va 1/2 - 3/4# s 50.
KING MACKERAL(drn): Sup mod, mkt abt stdy, nso. NC$1.30-1.35.
TUNA: Sup. H. NC yellow-fin(rnd) s $1.75

SHELLFISH: Supply moderate, demand moderate, market about steady.

(SELECTED ENTRIES)

CLAMS, HARD(bu): Sup lt-md, mkt abt stdy. NY(LI) chow $11-11.50 fh/fl, cherry $17-19 fl a/s, necks $47-50, lge $42-45. All fh/fl, a/s/p/q & ont.
CRAB MEAT: Sup. mod, mkt abt stdy. Fla: jmb lmp $9.75, lmp s $6.50
OYSTERS, SHELL(bu): Sup lt. NJ & NY(LI): $29.
SCALLOPS, SEA: Sup mod, mkt abt stdy. N.Bed $3.45 fh/fl. NC s $3.40.

SOC
5,6

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
MARKET NEWS BRANCH

NORTH CAROLINA LANDINGS
May 4-10, 1979

NORTHERN DISTRICT:
FINFISH: Bluefish 30, catfish 48, croaker 17, fluke 145, sea trout, gray 134, sea bass 65, striped bass 17, spot 8
SHELLFISH: Hard crabs 130

CENTRAL DISTRICT:
FINFISH: Bluefish 6, croaker 148, fluke 172, sea trout, gray, 77, king whiting 1, sea bass 6, spot 45.

SOUTHERN DISTRICT:
FINFISH: Bluefish 3, croaker 15, fluke 3, sea trout, gray 12, sea bass 1, spot 6, shad 1, snapper 5, catfish 1, eels 1, grouper 4, king mackeral 1, king whiting, 1.
SHELLFISH: Hard crabs 10, shrimp 3.

STUDENT WORKSHEET

GREEN SHEETS STUDY

1. What information is provided about bluefish?

2. What information is provided about eels?

4. What is the price for bonito?

5. What is the price for cherry stone clams?

6. If you had 750 pounds of King Mackerel how much money could you make?

7. How much bluefish was landed in the northern district of North Carolina?

8. How much hard crabs were caught in all of North Carolina?

9. How many different types of finfish were caught in North Carolina during May 4-10, 1979?

CRAB MEAT SALAD

1 pound blue crab meat, lump
grade, fresh or pasteurized
1 cup celery, chopped
2 tablespoons sweet pickle, chopped
2 tablespoons onion, chopped
2 hard boiled eggs, chopped
Dash pepper
1/2 teaspoon salt
1/2 cup mayonnaise or salad dressing
Crackers

Remove any remaining shell or cartilage from crab meat. Combine all ingredients except lettuce. Chill 1 hour in refrigerator. Serve a small amount on a cracker to each student.

SPICY PAN FRIED CROAKER

3 pounds pan-dressed golden croaker
(approximately 12 fish), or other
pan-dressed fish
1 cup yellow cornmeal
1 teaspoon salt
1/2 teaspoon pepper
1 1/2 teaspoons paprika
1/2 teaspoon celery salt
1/4 teaspoon dry mustard
1/4 teaspoon onion powder
Oil for frying
Lemon wedges

Clean, wash and dry fish. Combine dry ingredients then roll fish in the mixture. Fry fish in shallow oil in a large fry pan over moderate heat for 4 to 5 minutes. Turn carefully and fry 4 to 5 minutes longer, or until fish flakes easily when tested with a fork. Drain on absorbent paper and serve with lemon wedges. Makes 6 to 8 servings.

HOW TO FILLET A FISH

SOC
6.2

1. Make first cut just behind the gills. Slice down to the bone, then, without removing blade, turn it and slice straight along backbone . . .

2. . . . to the tail. Note that the fillet has been cut away from the rest of the fish. After slicing fillet off at tail, turn fish over and repeat procedure on the other side.

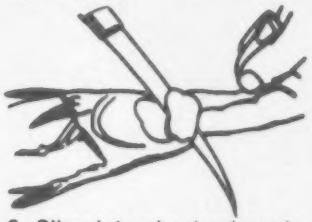
3. With both sides removed, you have cut away both fillets without disturbing fish's entrails. This is the neatest and fastest way to prepare fish. Now to finish the fillets.

4. Next step is to remove the rib section. Again, a sharp, flexible knife is important to avoid wasting meat. Insert blade close to rib bones and slice entire section away. This should be done before skin is removed to keep waste to a minimum.

5. Removing the skin from each fillet is simply a matter of inserting the knife at the tail and "cutting" the meat from the skin. Start cut ½ inch from tail end of skin, allowing wedge for best grip. With the proper knife, like the "Fish 'N Fillet," it's easily done.

6. Here is each fillet, ready for the pan, or freezer. Note there is no waste. Remember not to overwash fillets. This will preserve tasty juices and keep meat in its firm natural state.

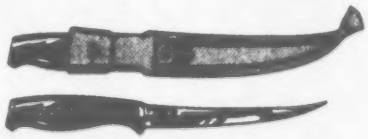
7. Cutting out the "cheeks" is the next important step. Few fishermen know that cheeks are the filet mignon of the fish. Though small, they're tasty and well worth saving.



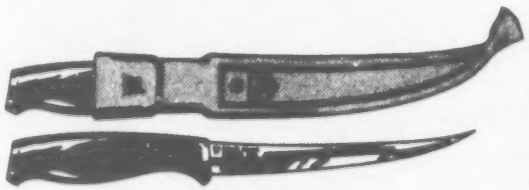
8. Slice into cheek where indicated then "scoop out" meat with blade, peeling away skin. Repeat on the other side. Many fishermen save cheeks until they have accumulated enough for a real gourmet's delight.

9. Here are all parts of the fish after you've finished. Note fish head, entrails, spine, tail and fins stay intact. This is the neatest way to prepare most game fish and, once you've mastered these few steps, the easiest.

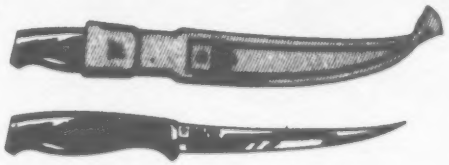
Normark Presentation Series



Presentation Filleting Knife 4"



Presentation Filleting Knife 7½"



Presentation Filleting Knife 6"

Rapala Fish'n Fillet Series

4" Fish 'N Fillet Knife

6" Fish 'N Fillet Knife

7½" Fish 'N Fillet Knife

8" Fish 'N Fillet Knife

Available at your dealers.

(Credit Normark Corporation, Minneapolis, Minnesota)

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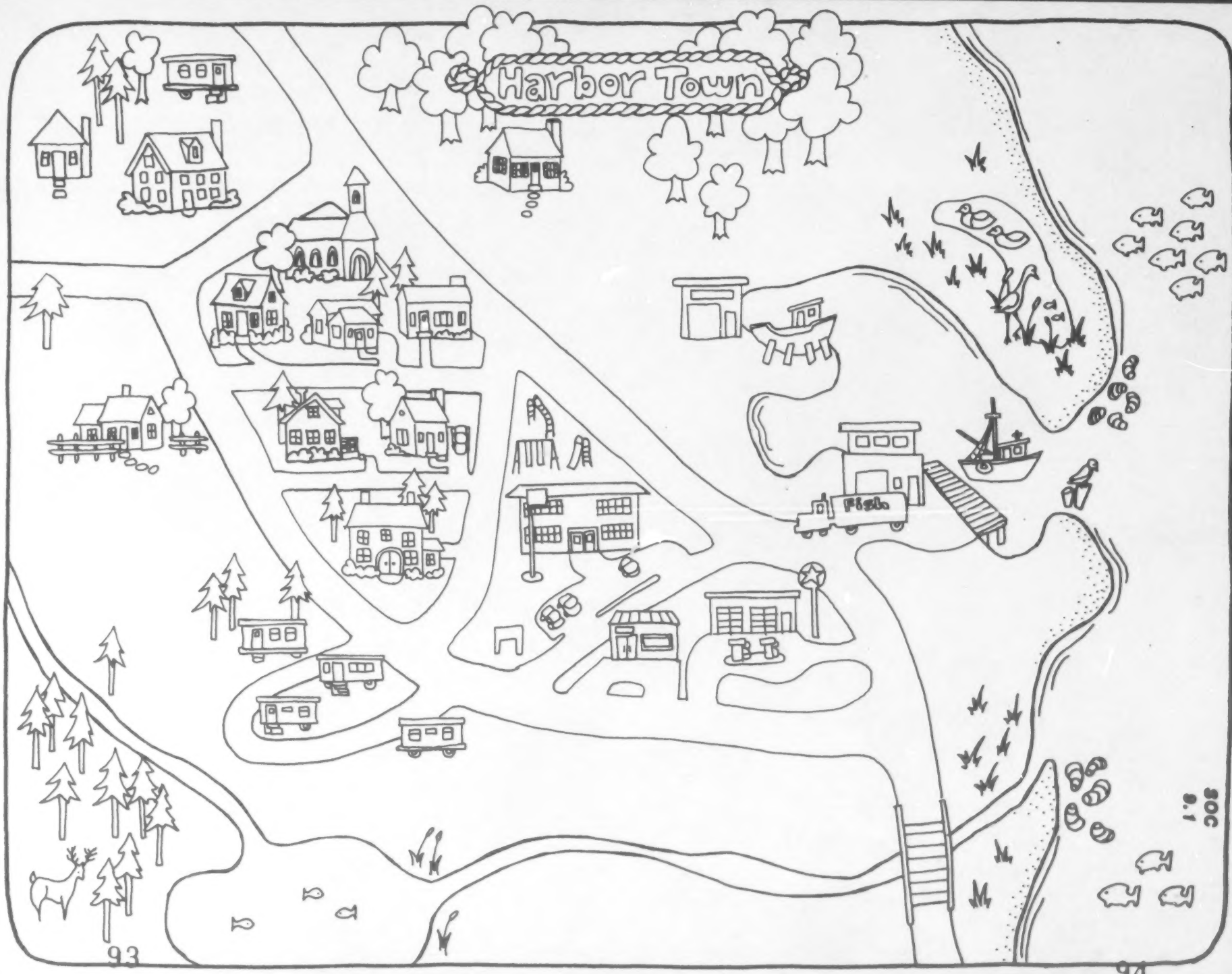
SAFETY PRECAUTIONS FOR WATER SKIING

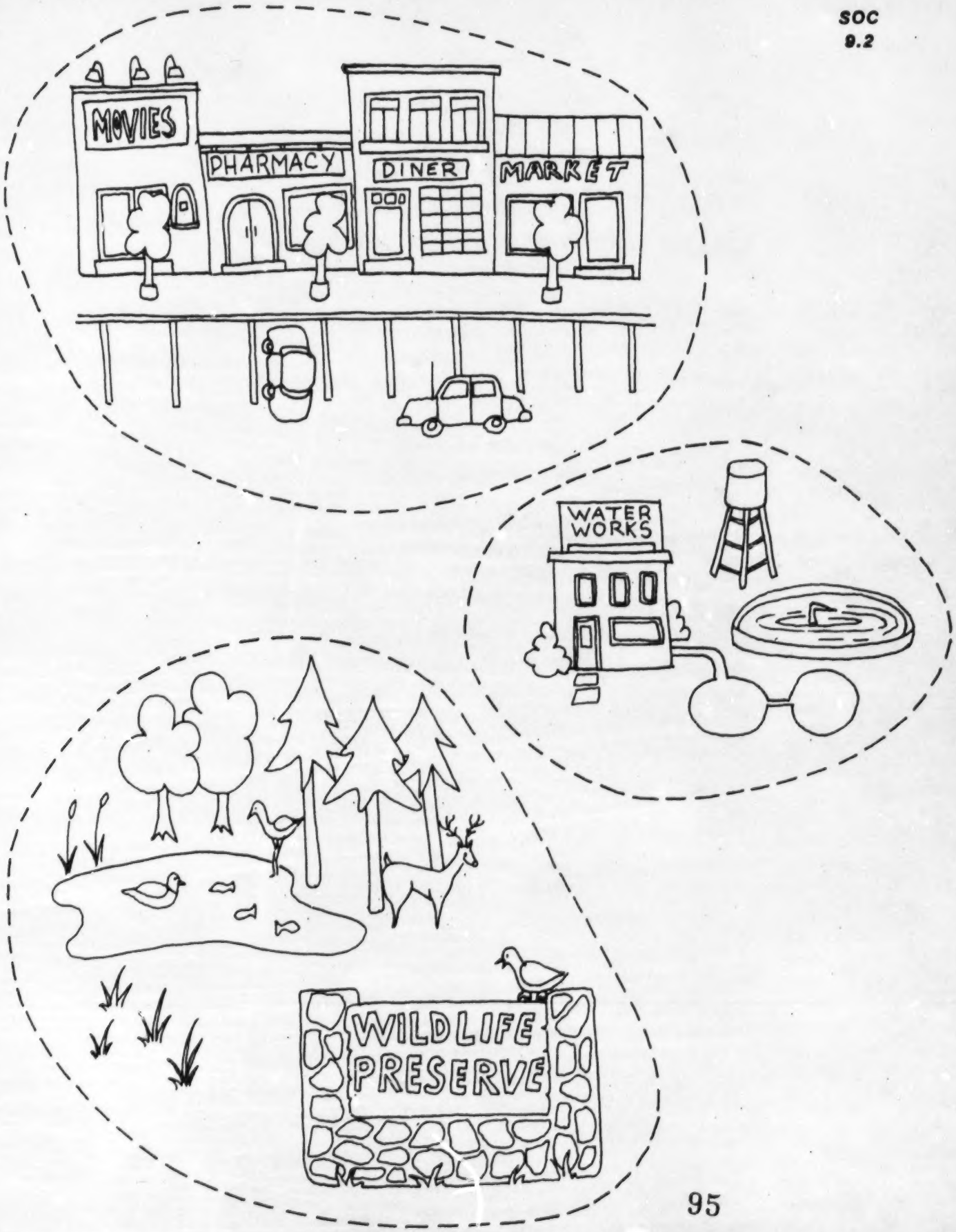
- A minimum depth of five to six feet free of obstacles is necessary for safe skiing.
- Each boat should be able to maintain a 200 foot wide corridor (100 feet on each side of the boat) and a length of 2000 to 3000 feet to prevent constant turning.
- Ideal water skiing weather is calm, sunny days and mild temperatures. Low temperatures, lightning, rain, turbulent weather and white capping make skiing hazardous.
- Ski in areas you are familiar with to avoid obstacles in the water.
- It is highly recommended that an observer be aboard whenever a skier is in tow.
- If the skier has fallen or made a water landing the boat operator must return to the skier without delay, because a fallen skier is difficult for other boats to see.
- If the skier is going to board the boat, the driver should <u>always kill the engine</u>. The skier should never use the engine as a ladder.
- The Personal Flotation Device (PFD) is the most important piece of equipment. The type III, "U.S. Coast Guard Approved," ski vest is recommended and should be of proper size and correctly fit.
- Do not drink alcoholic beverages when towing skiers.

Information printed here is available from: The American Water Ski Assoc.
P. O. Box 191
Winter Haven, FL 33880

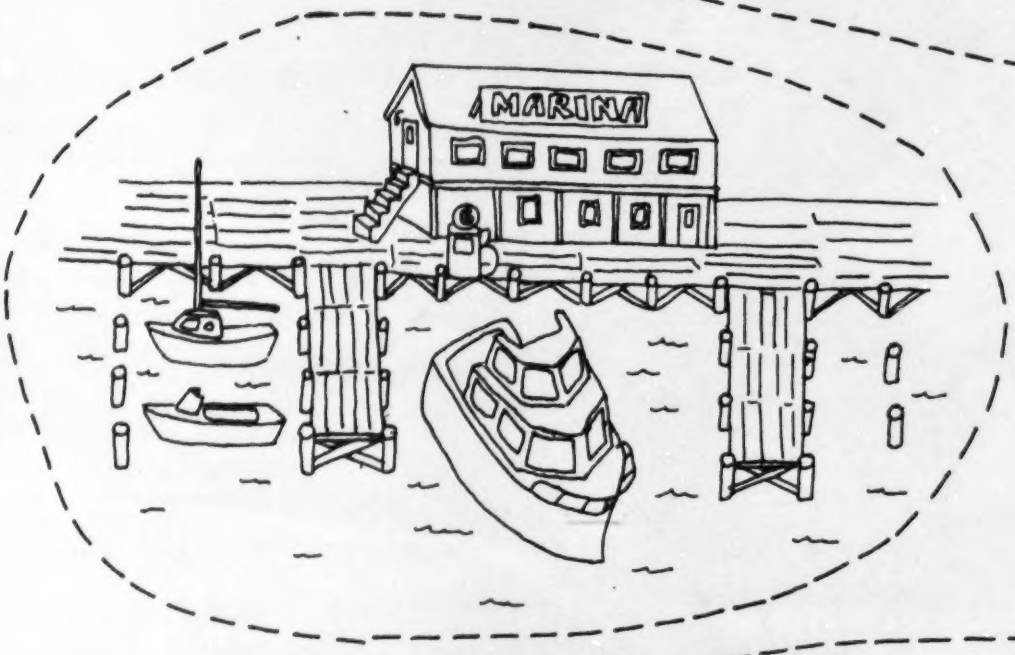
U. S. Coast Guard, <u>The ABC's of Water Skis</u>, Washington, D.C.: GPO, 1980.

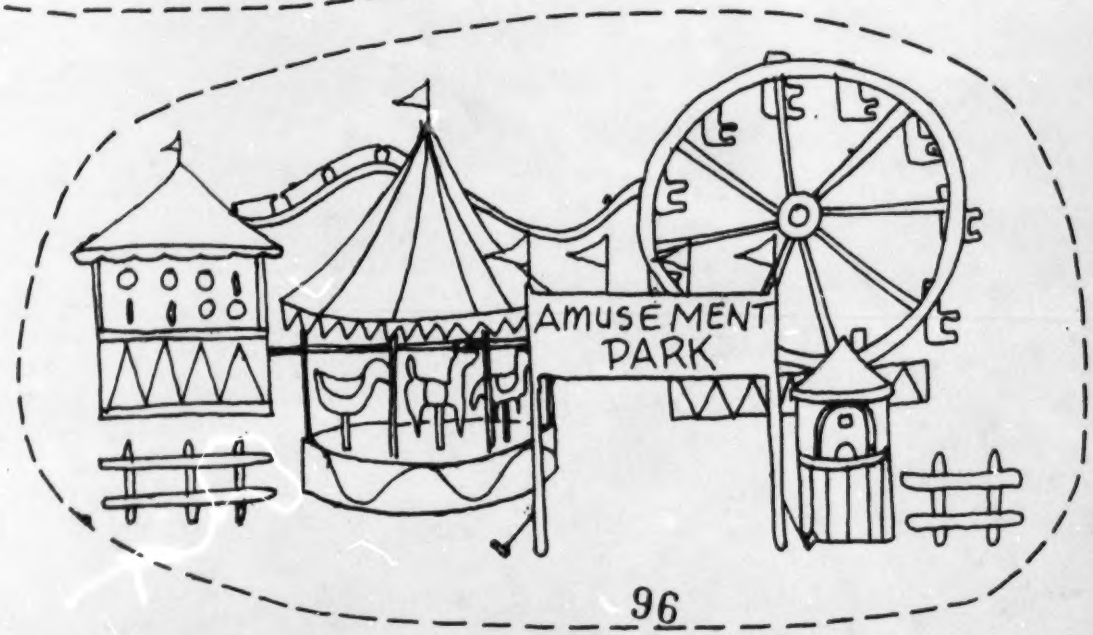


SOC 8.1


MOVIES
PHARMACY
DINER
MARKET
WATER WORKS
WILDLIFE PRESERVE

BOAT SHOP
ICE
FISH PACKING
FUEL


MARINA


AMUSEMENT PARK

Marina Advantages

- provide recreational boats a convenient place to dock
- create new business
- create more jobs
- more people will be able to rent a boat and enjoy water-sports
- small commercial boats will be able to dock and avoid damage caused by larger boats passing by or docking

Marina Disadvantages

- spillage of gasoline, oil and sewage may pollute the water
- land will have to be cleared and developed for construction; silt from runoff will inhibit tne shellfish in the area

Seafood Industrial Park

Advantages

- provide a modern and safe harbor for a commercial fishing fleet
- provide a center for seafood processing and market distribution
- people in the area will be hired to work in new businesses and industries
- becuase of the local markets selling to the foreign markets, (New York, Philadelphia, etc.) prices to the fishermen will be improved

Seafood Industrial Park

Disadvantages

- marshland will be destroyed and filled; fish and wildlife will be reduced in number, possibly threatening endangered species like the alligator and osprey
- loss of marshland will reduce the productivity of the estuary causing a decrease of shellfish and finfish
- traffic problems will increase; larger and faster trucks will be coming through residential areas
- more people will relocate into Harbor Town for job-related reasons creating crowded and over populated areas
- zoning will have to be considered

Wildlife Preserve Advantages	Wildlife Preserve Disadvantages
- will be a haven for animals and birds in the area - will have campsites and a nature trail for campers - will preserve the animals in their natural habitat - all people will be able to enjoy the beauty of animals in the wild	- hunting and fishing will no longer be allowed in the area - residential taxes will increase for safety structures (fences, etc.) and maintenance of the preserve - because the area is protected, more animals will survive there and possibly cause over population - raccoons, opossum, etc., may vandalize area resident's trash cans, gardens, etc.
Sewage Treatment Plant Advantages	**Sewage Treatment Plant Disadvantages**
- provide effective treatment of waste water - prevent health problems from seepage of septic tanks in low lying areas - problems from private water pumps and sewer lines will be eliminated - a sufficient supply of water will be available when the electricity is out	- residents must pay a monthly sewer and water bill - wherever the sewage treatment plant is located, neighbors will complain - the treated water cannot be guaranteed 100% pure

Shopping Center Advantages

- provide a convenient place for area residents to shop
- new businesses will move into the area to occupy the stores
- new jobs will be created
- people will shop locally, keeping revenue in the county
- revenue taxes will be returned to the county for improvements to other area

Shopping Center Disadvantages

- the shopping center area will not be available for housing or other developments
- greater chance of flooding from parking lot runoff
- water that rushes into the estuary creeks will increase fresh water and may inhibit growth of fish and/or shellfish
- litter will become a problem

Amusement Park Advantages

- provide recreation for children and adults
- create more jobs and new business
- will bring in money and taxes to pay for other improvements in the area
- will provide jobs for high school students in the summer

Amusement Park Disadvantages

- the area will be an eyesore and noisy
- machines that operate the rides may add to air pollution
- there will be a greater chance of electrical overload and therefore be hazardous to nearby residents and businesses
- children may play near the rides during non-operative hours and get hurt

Water, Fish, and Shellfish	Fisherman
Marshland Animals	Sportsman
Forests	Teenager
Store Owner	Real Estate Developer

Marsh	Tourist
Unemployed Worker	

SCORE SHEET	Water Treatment Plant		Wildlife Preserve		Shopping Center		Seafood Industrial Park		Amusement Park		Marina	
	yes	no	yes	no	yes	no	yes	no	yes	no	yes	no
Forests												
Marsh												
Fisherman												
Store Owner												
Teenager												
Tourist												
Marshland Animals												
Unemployed Worker												
Sportsman												
Water, Fish and Shellfish												
Real Estate Developer												
TOTALS												

TALLY SHEET

PROPOSED PROJECT	LOCATION
Wildlife Preserve	
Shopping Center	
Water Treatment Plant	
Seafood Industrial Park	
Amusement Park	
Marina	

TALLY SHEET

PROPOSED PROJECT	LOCATION
Wildlife Preserve	
Shopping Center	
Water Treatment Plant	
Seafood Industrial Park	
Amusement Park	
Marina	

WANCHESE HARBOR PROJECT TEST

1. The Wanchese Harbor Project is designed to

   a. enlarge the existing harbor and to promote the use of Wanchese as a port of refuge.
   b. create a major seafood receiving, processing and distribution center.
   c. create new jobs in an economically depressed area.
   d. all of the above choices.

2. Which government agencies are financing the Wanchese Harbor Project?

   a. U.S. Fish and Wildlife, National Park Service, Wanchese City Council
   b. N. C. Department of Natural and Economic Resources, Coastal Plains Regional Commission, Economic Development Administration, U.S. Army Corps of Engineers, Dare County
   c. N.C. Fishermen Association, Seafood Processors of the Southeast, National Marine Fisheries, Marine Science Council

3. How will most processed seafood be transported from the Seafood Industrial Park?

   a. trucks
   b. airplanes
   c. trains
   d. cargo ships

4. Which statement best describes the changes in water and air quality after the Seafood Industrial Park is completed?

   a. Smog is expected to develop with the drastic increase of diesel fumes from fishing vessels.
   b. The water in the harbor will not be fit for any use after the fish processors dump the fish wastes products into the water.
   c. The water quality in Mill Creek and the harbor will improve because of the waste water treatment plant.
   d. The smell from the seafood processing houses will be unbearable.

5. Which fish and shellfish are most important economically to North Carolina?

   a. striped bass, squid, shark
   b. menhaden, flounder, shrimp
   c. eels, bluefish, red snapper
   d. blue marlin, dolphin, horseshoe crab

6. What are the environmental impacts as a result of the Wanchese Harbor Project?

   a. About 42 acres of freshwater marsh will be destroyed.
   b. There will be no environmental impacts to the area.
   c. About 42 acres of hardwood forest will be destroyed.
   d. About 30 acres of oceanfront property will be destroyed to build the harbor.

7. Which occupations require skilled tradesmen at the Seafood Industrial Park?

   a. machine operators
   b. boat building and repair
   c. seafood processors
   d. longshoremen positions

8. What factor(s) are important in planning recreational facilities and activities?

   a. population
   b. recreational needs
   c. amount of leisure time
   d. all of the above choices

9. Who does the seafood wholesaler sell his product to?

   a. housewives
   b. fishermen
   c. restaurants
   d. all of the above choices

10. Which businesses will be located at the Wanchese Harbor Project?

   a. Marine Land
   b. oil refinery
   c. seafood processors
   d. Navy Ship Yards

WANCHESE HARBOR PROJECT TEST

ANSWER KEY

1. d
2. b
3. a
4. c
5. b
6. a
7. b
8. d
9. c
10. c